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URBANA, ILL.

President of the American Pharmaceutical Association (1904); General Secretary (1911); First Editor JOURNAL A. PH. A.; Chairman of the Council A. Ph. A. for a number of years; Chairman of the Board of Trustees U. S. P. IX; President of the National Drug Trade Conference, etc.

JAMES H. BEAL

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

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JAMES HARTLEY BEAL.

Among those who are active workers in the pharmaceutical field of to-day there are probably not many who have devoted their lives more completely and unselfishly to the best interests of that calling than Prof. James Hartley Beal, whose career began September 23, 1861, as the eldest son of Jesse and Mary McKnight Beal, of New Philadelphia, Ohio. At an early age he became his father's frequent companion on long walks in the woods and fields, and to this youthful experience he has often attributed his lasting interest in plant life and love of nature. It is still a source of pleasure to him to recall these memories of his boyhood days, during which the foundations were laid not only for the acquirement of useful knowledge and of systematic habits of study which were invaluable in after years, but for a sympathetic and life-long comradeship between father and son.

His early education was obtained in the public schools of New Philadelphia and at Jewett, Ohio. At about the age of seventeen years he began his first regular work as a drug clerk, at Uhrichsville, Ohio, and later continued for several years at Akron, Ohio. While at Akron he also carried several branches of study under tutors in Buchtel College. In 1882 he entered the School of Pharmacy of the University of Michigan, where he was able to carry the regular work of that department and also to pursue studies in other departments of the University. After a year's work at the University of Michigan, he completed a literary course at Scio College (since merged with Mt. Union College, Alliance, O.). After graduating at Scio he returned to the University of Michigan for a year's work in law and philosophy, and then entered the Cincinnati Law School, from which he graduated with "honorable mention" in 1886, and the following September was married to Fannie Snyder Young, of Uhrichsville, O. He soon after accepted a position as instructor in Scio College and in 1889 was given the chair of pharmacy and chemistry. Some years later he was elected to the chair of applied pharmacy in the Pittsburgh College of Pharmacy, and thereafter divided his time between the two institutions. In 1902 the Scio College of Pharmacy and Chemistry was established on an independent basis, with Prof. Beal as Dean, and in 1908 it was consolidated with the Pittsburgh College of Pharmacy.

Prof. Beal became a member of the American Pharmaceutical Association in 1892, and has since served in various capacities as Secretary, and then as Chairman of the Section on Education and Legislation, President of the Association (1904–5), Chairman of the Council, Chairman of the Conference of Pharmaceutical Faculties, etc., besides serving on various important committees. His first paper, on "The Definition of a Poison," was presented at the Asheville, N. C., meeting in 1894, and was rejected by the Committee on Publication. Since that date he has contributed numerous papers to the pharmaceutical press and to the

annual meetings of the A. Ph. A., of which he has so long been an active and loyal member.

In 1900 Prof. Beal was elected a member of the U. S. P. Board of Trustees, and has served as chairman of that body since 1910. In 1911 he was elected General Secretary of the American Pharmaceutical Association and Editor of the official Journal of that organization, the first number of which appeared in January, 1912. The difficult task of launching a new publication and at the same time performing the onerous duties of General Secretary—which at that time included the general supervision of the publication and sale of the National Formulary—together with the care of some considerable private interests, lead to the almost inevitable result of failing health, which compelled his resignation from the combined offices June 1, 1914. A few months later, Prof. Beal removed to Urbana, Ill., where he has a beautiful home and, although still a very busy man, has time to enjoy life more fully than during those years when business obligations claimed so large a portion of every day and often extended far into the night.

As stated in a preceding paragraph, Prof. Beal has always been a lover of nature and likes to "escape and be free in the joy of the open air." For many years it has been his custom to spend a few weeks each summer, in the company of congenial spirits, camping in the Great North Woods of Wisconsin or in the Ontario Highlands, where the finny denizens of the beautiful lakes and streams afford the true sportsman opportunity for securing an abundance of material for the "fish stories" he will take back with him to "the States" and also a welcome addition to the camp fare. To escape the rigors of the northern winters, there is also the opportunity of spending a few months at his Florida home, where he turns fruit grower on a small scale, and enjoys the pleasures and privileges of the fortunate dwellers in that delightful region.

Prof. Beal has been Chairman of the A. Ph. A. Commission on Proprietary Medicines since its organization, and has been tireless in his efforts toward the accomplishment of the work with which the Commission is charged. During his membership, covering a quarter of a century, he has always had the interests of pharmacy in view and has spared neither time nor energy for the accomplishment of those undertakings which seemed to him to be for the uplift and general betterment of the profession as a whole. In this work his thorough legal training has been of great value, while his force of character and magnetic personality command thoughtful attention to the sound arguments presented, which frequently clear away differences of opinion resulting from a mistaken view-point. One of the legislative achievements which earned for him the lasting gratitude of the people of his native state was the enactment of the Beal Local Option Law, secured by him while a member of the 75th General Assembly of Ohio, a measure which was upheld by the United States Supreme Court, and which has since served as a model for the drafting of local option laws in other states. He also drafted the "Model Pharmacy Act" approved by the A. Ph. A. at the Richmond, Virginia, meeting in 1900, a model poison law, and a model state anti-narcotic law (1903), all of which have been frequently copied from in state and national legislation. And he is frequently called upon by legislative committees for assistance in the preparation of bills of interest to pharmacists.

Prof. Beal possesses in an unusual degree the qualifications of the true teacher, and hundreds of chemists and pharmacists in the United States are proud to acknowledge that much of their professional success is due to the careful training received while under his instruction.

As drug clerk, professor of pharmacy and chemistry, author of several textbooks and many papers on pharmaceutical and general topics, Prof. Beal has been prominent in various lines of professional activity, and enjoys in large measure the respect and esteem alike of those interested with him in the struggle for the betterment of conditions affecting all branches of the drug trade and of those with whom he is associated in the world at large. M. L. C.

EDITORIAL

E. G. EBERLE, Editor 253 Bourse Bldg., PHILADELPHIA

WILL PHARMACY FIND HERSELF?

IN one of Kipling's tales, "The Ship that Found Herself," the story of a newly launched ship, severely storm-tried on her first voyage, is narrated in an instructive way. Under the stress of headwinds and heavy seas, the various parts of the ship's structure—the beams, the plates, the shafting, and so on—feel the strain and pull, and voice their separate grievances, blaming everyone but themselves for the excessive burdens put upon them. The steam alone, having been through similar trials before, counsels patience and coöperation. At last the discordant elements are harmonized and integrated and the voice of the good ship "Dimbula" is heard for the first time.

This allegory holds a lesson for our profession, at this critical period in our history. Will pharmacists rise above petty and personal considerations and weld themselves firmly together into a harmonious whole? How else shall the good ship be saved? It is an old axiom that the whole is *equal* to the sum of its parts: it is the newer experience that these parts coördinated and combined are far *greater* than their sum. President Wulling's address presented a powerful plea for the union of all pharmaceutical forces and organizations. How shall the beginning be made? Does not the National Drug Trade Conference offer a nucleus? Here are represented the national associations which can speak with authority for all the branches of pharmacy. Already the Conference has made itself felt in pharmaceutical affairs. It has exercised no small influence in shaping legislation which concerns all pharmacists. The American Pharmaceutical Association has formally expressed its willingness to give the Conference added powers. Why not begin the integration here and now? W. B. D.

MEDICINE, PHARMACY AND CHEMISTRY.

IT has been my good fortune to be unexpectedly called to fill the high office of President of the American Pharmaceutical Association as the result of the sudden and sad death of its duly elected president, my highly esteemed and respected friend, Charles Holzhauer, of Newark, N. J. Whatever plans or appointments he had made shall be my plans and appointments as well.

As his death came so early in his term of office he scarcely had time to formulate, much less carry out, any plan of action. According to my point of view it is unfortunate that the president of this association as a rule only makes his recommendations and suggestions at the meeting at which he presides and which is at the close of his term of office, thus depriving him of the opportunity of putting such suggestions into practice. For this reason I have concluded to lay before the pharmacists of this country in general and of this association in particular some ideas and suggestions which appear to me pertinent and advisable to-day. I will refrain from making any criticisms of pharmacy and of our association, but confine my remarks to constructive suggestions which I trust may induce pharmacy and all

other pharmaceutical associations as well as this association, to seriously consider the *status quo* of their profession and its associations with an end in view of meeting the needs thereof by such action as they may deem wise. I am presenting my subject in the form of a triple parallel between Medicine, Pharmacy and Chemistry, all of which are cognate sciences and closely identified and connected with one another from their inception. My presentation is to be a historical one and its survey shall cover briefly the period from Galen, who was born in 132 A. D., to to-day. This brief outline of history will point our clearer and more effectively than can words of mine why pharmacy has not kept pace with her sister sciences and why this association has not developed and grown like the great national associations of medicine and chemistry. There is a reason, and as in case of this cataclysm of war now devastating the civilized world, history reveals that reason.

Pharmacy and pharmacies originated amongst the Arab tribes at the dawn of the Christian Era. The name to be sure is of Greek origin and is derived from the Greek word *Pharmakon*, meaning a drug. The word Chemistry is, on the other hand, derived from the Arabic words "*al*" meaning "the" and "*kheme*," meaning "black earth," together, alchemy, or the black art; and later developed into "Chemistry" by omitting the particle *al* and lengthening the word. Another derivation is claimed, however, from the Greek words *chymeia*, meaning alchemy, and *iatreia*, meaning medical treatment. This derivation is based upon the fact that out of a combination of the alchemists and their study of medicines given in medical treatment, resulted the science of chemistry. Medicine is derived from the Latin word, *medicina*, the art of healing, again derived from the word *mederi*, to heal. Thus the oldest of the three sciences, medicine, has a name dating from a later period in history than either of its derived sciences. Medicine dates back to Hippocrates who lived in Athens at the time of Pericles, about 450 B. C., and was supposed to be eighteenth in direct descent from Aesculapius.

Medicine developed very gradually until the time of Galen, who developed the use of vegetable drugs and herbs in pharmacies where at that time medicine was practiced with the administration of such vegetable potions and herbs as were then used. Those physician pharmacists were also alchemists and practiced during the dark ages and middle ages the so-called dark or occult arts, including necromancy, magic and much quackery and deception. From the time of Junius Firmicius about 300 A. D. we first meet the term Chemistry, from the Greek *chemen* and *chemeia*, meaning the book and the art of ennobling metals, so that chemistry really means originally the art of ennobling metals, and from this time on through the centuries, even up to the nineteenth, kings and princes were induced to employ and subsidize these alchemists to try to convert copper and lead or tin into silver and gold. Prominent among these were Geber the Arabian, Albertus Magnus, Roger Bacon, Raymond Lullus, all of whom believed that there existed somewhere the philosopher's stone, the touch of which would commute base metals into gold. Medicine employed only vegetable and herb remedies during this period, and hence the name galenicals for this class of preparations. One of these, Zorimos of Panoplis in the 4th century, describes a "water of the gods" as *Panacee* (from *Pan* and *aqua*) as a cure-all and from this is derived our word Panacea.

In the latter part of the 15th century the alchemist Basilius Valentinus developed many inorganic preparations of mercury, antimony and arsenic, and used them as medicines besides the herbs of the Galenites. Then in the 16th century we pass to the school of medical alchemists, the most famous of whom was Paracelsus. This school was called the Iatro-chemical school and its theory announced by Paracelsus was that the healthy body, being made up of certain chemical substances in solution, could when diseased be cured only by the same chemical substances. Hence he preached that Galen's theory of herbs and vegetable drugs curing the diseased body was erroneous. He hence dosed heavily with mercury salts, blue vitriol, sugar of lead, antimony salts, sulphuric acid, iron salts. While he and especially many of his pupils killed many people and were driven out of town after town, his theory gave the next great impetus to pharmacy and incidentally as well founded chemistry, for the great problem now became to invent and discover new chemical compounds for the relief of disease and this was done in the shops of the alchemist pharmacist. His successors, Sylvius, Tachenius, Van Helmont, Agricola, Glauber, Libavius and Pallissy, in consequence developed a great number of such metallic compounds as well as

some organic compounds. Here we hence see that in the early history of all three sciences, medicine, pharmacy and chemistry, all three were practically united in one and frequently practiced by one person, who however almost invariably received his training in a medical school and bore the title "Doctor." The alchemists's shop became the pharmacy and the owner of it practiced the healing art as well as the preparation and compounding of his medicines. From these shops developed through the zest for discovering new medicines, the chemist and the science of chemistry.

Later came the separation of all three during the eighteenth and nineteenth centuries and gradually the chemist became the scientific student looking for scientific laws governing the composition of matter and the changes it undergoes; the medical man became the curer of disease and the student of the human body in health and in disease, while the pharmacist became the student of the plants of the field and forest, the chemicals of the chemist and their proper preparation in forms suitable for administration as medicines. Each had his field and each field was important and required great patience, ingenuity and careful study and observation. Each science developed gradually and steadily along different lines, medicine and pharmacy confining their activities to curing disease, while chemistry not only did its share to produce new medical substances but spread out gradually over all the other branches of industry that have to do with matter of any and every kind, until to-day any industry that does not employ the latest discoveries and methods of chemistry in its processes, from the laundry up to the steel plant, can not successfully compete with its competitor that does. The chemists have for a century flocked to the universities all over the world to complete their needed knowledge and practice culminating in the securing of the degrees of "doctor of science" or "doctor of philosophy," which stamp them as broadly educated men with well-trained minds. The medical men and the pharmacists during the eighteenth and especially the nineteenth centuries sought their education in so-called colleges of medicine and pharmacy in this country. These colleges were at first most crude and were practically workshops for training the hand as well as the head in a practical knowledge of their professions. They were very much mixed in quality and in the products they turned out; some were fairly good, some were indifferently good, many were markedly inferior, and but few were high class. Many were run for the financial returns they gave to those who founded them, owned them and taught in them. The doors were wide open and anyone could make a try at learning medicine or pharmacy if he paid the fees and passed the examinations, even if he did not, as frequently occurred, attend all or even most of the lectures.

The medical college granted the degree of doctor of medicine, not so much because the course of mental training justified that exalted title, but because those practicing the science of medicine were known to the laity as doctors. The pharmaceutical college never essayed at that time the degree of doctor of pharmacy, and to its credit be this said, because the course of training and study certainly did not merit the title. Its degree was and to a large extent still is Ph.G., or graduate in pharmacy, indicating that the holder of the degree has studied, practiced and graduated in pharmacy. In those days medicine and pharmacy ran along together in standing and quality of men turned out. A change came over the scene, however, during the last decade of the nineteenth century, for then medicine became organized. All its manifold branches, instead of getting further and further apart and developing a school for surgeons, one for ophthalmologists, one for obstetricians, and gynecologists, one for dermatologists, pathologists, etc., etc., as seemed to threaten, due to the ever-increasing specialization needed to really properly become a successful medical man that could demand confidence and meet with success, came together under the aegis of the American Medical Association and formed so as to speak a medical combination or trust. To medicine's lasting credit and benefit be it said that this was a wise and far-seeing move and inured immensely to the benefit of the profession of medicine and of the general public who are their patients. Pharmacy, however, did not organize by gathering together the several branches of its profession under one roof and management, but, instead, her disintegration into more and more branches and associations continued and

even increased. There are in fact to-day no less than ten pharmaceutical associations of a national character, to wit: the American Pharmaceutical Association, the National Association of Retail Druggists, the National Wholesale Druggists' Association, the Proprietary Association of America, the American Drug Manufacturers, Association, the Association of Pharmaceutical Chemists, the National Association of Boards of Pharmacy, the National Drug Trade Conference, the National Pharmaceutical Service Association, the National Retail Drug Clerks' Association. Each of these has to do with pharmacy in some shape or another, but each is as independent of the other in policy, management, membership and location as if they belonged to different professions or industries. Medicine developed a master organizing mind, George H. Simmons, while pharmacy developed no such master mind for organization. The organization took place first and practically all allopathic medicine has rested and to-day rests in the American Medical Association. One of the first results and the wisest move made by medicine was to gradually but steadily raise the educational requirement for admission to medical colleges, and then to lengthen and strengthen the medical courses. This began in the last decade of the nineteenth century. It has reached such a stage now that three results are plainly apparent:—first, the reduction in the number of medical colleges and their gradual absorption by universities; second, the requirement of the degree of A.B. or an approximate equivalent for admission to the medical courses, resulting in the degree of doctor of medicine approximating in quality that of the doctorates of philosophy, law, science and theology; and, third, the vastly increased influence of medicine and medical men in the councils of state and nation as well as in the service of the Government. Without the thorough organization and centralization of all branches of medicine and medical associations little if any of this wonderfully powerful American Medical Association could ever have developed. It almost succeeded in creating a separate Department of Health as one of the departments of our Government, and it may yet succeed in accomplishing this result. There is danger, of course, of this American Medical Association with its 65,000 members out of 150,000 physicians in this country overreaching itself and exceeding its legitimate sphere because of its wonderfully successful growth and development of strength and power. Many signs point to this possibility but it is to be hoped for the best interests of medicine, of the public, and of pharmacy that right reason and sound judgment will prevail and prevent the present great and useful organization riding for a fall.

Chemistry, too, has been effectively and successfully organized and consolidated in the great American Chemical Society, which to-day has far more members than any chemical society here or abroad, in fact, has more than all of them together in England, France and Germany. It at first was threatened with disintegration and separation into several independent units, as is pharmacy to-day; but thanks to the liberal education and consequent broad view of its members and to the presence thereamong of wise counsellors and able organizers, it weathered the storm and is to-day a power and citadel of strength that is supplying the needs of our country, cut off as it has been from so many of its needed essential chemicals and medicines. In the crucible of this great war, chemistry has been weighed in the balance and not found wanting. This means much, much more in future growth, progress and industrial independence than most people realize or than pen can portray or financier estimate in dollars and cents. Beginning in 1895 with 950 members, it gradually

attained in 1900, 1200 members; in 1910, 4500 members, and in 1917, 10,135 members. Chemistry has been the great energizing agent of our industries. When we say only the "squeak" is lost we pay a tribute to chemistry, and every year more and more industries "lose only the squeak" thanks to their appreciating that scientifically worked out processes and utilization of waste make world competition and unexcelled products possible. This is due in large measure to the organization of the chemical forces in the coöperating and coördinating American Chemical Society, which by its two great Journals, the *Journal of the American Chemical Society* and the *Journal of Industrial & Engineering Chemistry* is offering to its members the very best there is in chemical science to-day, without which they could not well keep abreast of the times. Just so is the *Journal of the American Medical Association* offering the medical men of this country a full and more than a full equivalent for their membership fee without consideration of the great benefits its organized strength offers them in protective legislation.

Pharmacy has, as we have seen, not profited by the experience of her former sister sciences. She has not seen the light and she has not developed the organizer and Moses who is to lead her out of the desert. Instead all her ten sub-divisions as separate national associations still each carry their own overhead charges and divide the influence and weight of pharmacy in national and state councils into ten parts. The inevitable result must follow, *viz.*, an unequal fight of organization against disorganization, and while chemistry and medicine will grow and prosper steadily, pharmacy will, unless she takes the lesson to heart, stand still, which means retrograde. The American Pharmaceutical Association has 2700 members out of 50,000 pharmacists in this country, or five percent against about fifty percent for both national associations of chemistry and medicine. If her ten associations were all consolidated into one association as has been ably pointed out by President Wulling at the Indianapolis meeting of the A. Ph. A. last summer, but with each retaining its own organization as a separate section of the same, the beginning of real advance would be made. Thus consolidated and if possible all meeting at one time and place, but in various rooms and with a permanent building as a home, a permanent management by a set of competent men, who would be well paid and on their job all the year, pharmacy would soon put out new shoots and rapidly become as beautiful a tree in the garden as are to-day those of medicine and chemistry. To be sure an effort in this direction was made when the National Drug Trade Conference was established in 1912, but unfortunately that Conference is without any power to do things and in consequence has not been able to accomplish much for pharmacy, although it did bring about the enactment of the Harrison Anti-Narcotic Law by the action of its constituent organizations—a truly great piece of constructive legislation. It is possible to effect the desired consolidation of pharmacy through the agency of the National Drug Trade Conference by getting that body to agree upon the general principle of such consolidation, and then through its delegates get the several national associations it includes to approve the movement and action. To do this the N. D. T. C. should appoint a special committee of six men to attend in a body each national association meeting, and, having announced its coming and plans beforehand, present same for adoption at the meetings. Should that not prove possible, then the simplest way would be to call a special meeting of the several national associations to be attended by those of the leading

members of each and at this meeting endeavor to bring about in 1918 what medicine and chemistry have done decades ago.

At this meeting the things to be accomplished and the ways and means of accomplishing them should be discussed at length and the work thus begun continue until pharmacy will be returned to a fitting place alongside her sister sciences and a place which she so richly deserves because of the important and necessary part she plays in the every-day life of this busy-day world. Among the topics to be discussed and included in the plan then to be proposed would be pharmaceutical education and preliminary requirements, united legislative work, central testing and standard laboratory, one strong, able and valued journal, drug clerk and employers' registration bureau, patent and trademark registration bureau, legal department, accounting, shipping, advertising and cost price bureau, exchange bureau for goods of retailer and jobber, pharmacopoeial and national formulary laboratory and bureau, establishment of local branches and consolidation of same and state associations with the national body.

If, during my incumbency of this high office of president of the oldest national and most representative pharmaceutical association, the cornerstone of a movement looking to the placing of pharmacy in her proper niche in the temple of sciences shall be firmly laid, I should feel proud indeed and I would be willing to devote my share of the time necessary to subsequently complete the structure.

My appeal hence to pharmacy and pharmacists and the entire drug industry is to consolidate their interests, not their business, and organize same in such a manner that the future of pharmacy in all its branches may become as representative and its degree as respected and high in grade as are to-day those of its sister branches of medicine and chemistry.

To this end I propose to try to present to each of these national associations and their members a plea for the consolidation of pharmaceutical interests into an organized and enlarged American Pharmaceutical Association together with a concrete plan for such consolidated or federated association, and to personally attend all their annual meetings and deliver my message, imbued and enthused with the hope that my efforts may result in some positive action being taken by each national association to coöperate in the movement and plan. No industry, institution or organization ever becomes great and influential among its own devotees or the public at large, that has no vision and realization of becoming something larger, stronger or better than it was or is. Self-complacency is synonymous with stagnation and retrogression. After the war the world's attitude to coöperation and consolidation will change; for these will be understood, in the light of our fight for democracy and greater freedom, to mean greater efficiency and greater possibilities. In all probability the Sherman Law will be materially modified or perhaps repealed. It is contrary to the spirit of to-day and to-morrow and in place of splitting the corporation into wee bits and preventing its working to its best advantage in the world contest for trade following this war, the Congress should and probably will permit and legalize consolidation and coöperation tempered, however, with regulation. This is hence the psychological moment for all drug associations to consolidate and coöperate. Will they see the necessity and catch the spirit of to-day?

A. R. L. DOHME.

SCIENTIFIC SECTION

SCIENTIFIC DRUG FARMING.*

BY H. C. FULLER.

I want to precede this reel[1] that I have brought, with just a few observations on the general subject of drug propagation. There has been some misapprehension in the minds of the great majority of the people regarding the question of drug supply, and especially drug growing. Most of us here are familiar with the literature that has been going the rounds of the scientific and especially the daily press on this matter, and with the alluring stories and propositions that have been placed before the general public relative to indiscriminate growing of drugs.

As I have sized up the situation after a good many years of study, there is a demand for the drug growing industry in this country. I believe, however, that the only important factors are those manufacturers who grow drugs for their own consumption, and enterprises for growing drugs whose sole object is the propagation, curing and marketing of these products. I do not think it will ever be possible, and I do not think it should be advocated to have the small grower, the small farmer with two or three acres, undertake the general propagation of drugs. It might possibly be profitable for a man of ability and with considerable land to grow certain drugs for some proprietary manufacturer or firm that would make a contract for his whole output.

In the first place the market conditions with reference to drugs are entirely different from those relating to other crops. The units consuming drugs are limited in number. They are practically confined to the manufacturing pharmacist, the manufacturing chemist and the crude drug dealer. The retail druggist does not require large amounts of crude drugs, and those he buys he can purchase to better advantage from the wholesaler, who in turn, of course, obtains them from the crude drug dealer. The question of sales is important. In fact, that is one of the most important points of this industry, and the novice can not cope with the skill and keenness of the drug buyer and drug broker.

The question of getting proper seed to start a crop is almost hopeless until the grower has studied the situation and developed his own stock. Then there is the question of proper soil and cultivation. Each drug requires different conditions and the grower should be a botanist; and he must know something about drugs and how the plants grow on their native heath before he can attempt to grow them commercially with any degree of success.

There is the question of plant diseases. Anyone who has ever tried to grow drugs has learned this lesson and also of the different insect pests that are likely to make luscious meals of drug crops. The growing of plant drugs requires the coöperation of a plant pathologist and a good entomologist.

Many of the most important, or staple, drugs that can be grown in the United States have to be started in greenhouses. This in itself requires quite

* Scientific Section, A. Ph. A., Indianapolis meeting, 1917.

[1] Motion pictures of the drug growing industry were shown.

an outlay of capital. Then, in order to produce enough material to make it worth while, special machinery is necessary both for planting and harvesting. And as drugs are not marketable unless they are of the proper appearance, and of the proper potency, the question of curing is extremely important, and that can only be done successfully in drying houses of proper construction, with proper regulation of heat, and other constant, careful attention until the crop is thoroughly cured.

Then, finally, and one of the most important features of the whole situation, is the control laboratory, because it would be ill-advised from every standpoint to go on the market with a batch of drugs of unknown potency.

There has been much progress made during the last few years in this work. Large pharmaceutical houses in the country have established their own drug growing farms, and they have been successful. The Department of Agriculture established the camphor industry in the south, and it has become an important industry. Hydrastis, which is important in our own materia medica, has been cultivated for a great many years by growers, operating small acreages in parts of the west and northwest. In Washington they have been doing something along that line, and the films which I have brought with me illustrate some of the points that I have tried to bring out in these prefatory remarks. The pictures will take you from the spring when we begin until the present time in our operations; in fact the last picture was taken only a few weeks ago when the thermometer was 124° F. in the sun.

(A series of pictures of the drug growing industry were here shown.)

DRUG PLANT CULTIVATION—DRUG PLANT BREEDING.*

BY F. A. MILLER.[1]

I will omit introductory remarks and begin immediately with the slides,[2] attempting only a brief explanation of the work that we have been doing.

That which we have attempted to do in Drug Plant Cultivation and Drug Plant Breeding has been along the lines of improvement and economic production. I mean by economic production, an attempt to determine the possibilities of growing the more essential medicinal plants upon a basis, that would enable us to grow them as we grow other economic plants. If we set out to grow medicinal plants, regardless of the cost of production, we can probably grow almost any of them, but if we limit ourselves to those which can be produced economically, there are limitations.

(A plot of digitalis in its first year's growth was shown, followed by others of the series.)

During the year that we were working on digitalis, we grew and tested a large number of varieties, in fact all the varieties which could be obtained from this country, England, Germany and Japan, making a special effort to obtain seed of all named varieties and species. *Digitalis purpurea*, being a domesticated form,

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* Scientific Section, A. Ph. A., Indianapolis meeting, 1917.

[1] Biological Department Eli Lilly & Co., Indianapolis.

[2] As indicated, Mr. Miller spoke while the pictures were being shown on the screen; the subjects related to breeding and cultivation of drug plants.

has been made to produce a large number of varieties, and our aim was to find one that was better in its physiological activities than the official digitalis. It has now been found that digitalis does not need to be grown through the second year to give an active leaf, the first year's growth being fully as active as the flowering plant.

You will notice in this slide a difference in the size of the beds. These are of the nature of test plots, and consist of measured areas. By keeping accurate expense accounts of these test plots, we obtain figures which indicate the possibilities of growing the different species on a larger scale.

The next slide is a view of a selection and breeding plot of all varieties tested. Thirty-two of them were grown and tested physiologically, the results of which were published some two years ago.[3] Some of the breeding work that has been done is shown in progress on this slide, the flowers being protected, of course, by ordinary paper bags to prevent cross-pollination.

We have also carried on experimental work in the greenhouse during the winter months, and this is digitalis growing in midwinter. You will notice that some plants are blooming. Digitalis is biennial but it can be brought into bloom by continuous growth without giving it the resting period which it has in its natural state.

Turning now to Cannabis, we have here a very luxuriant growth. This is a strain which we have developed by selection. Animal tests on this drug indicate about 90 to 95% activity when compared with good Indian Cannabis. This slide shows the harvesting of the same field of Cannabis, where you will note the rows to be about three feet apart, the plants being much taller than the average sized man. Some of these plants reach a height of from twelve to fourteen feet. The problems of harvesting are suggested here, where the cutting is being performed by hand. We have attempted to cure Cannabis partially in the field, cutting and binding into bundles and shocking. It is then taken under cover and the curing completed. Later the inflorescence is removed from the stems and separated from the leaves and seed. No effort has been made to eliminate the male plants. That only aids in the reduction of the percentage of seed in the finished product, and we find that we can do that more economically by allowing the plant to produce seed and then remove these at the time of curing.

We have touched lightly upon the question of fertilizers. They are necessary on some types of soil for successful drug cultivation. This slide represents a pot experiment carried out in the greenhouse with various types of fertilizer. We have in the first row, manure and potash; in the second, manure, potash and phosphorus; and in the third, phosphorus and potash. This was an attempt to determine the best fertilizers for Cannabis, and if I remember correctly, the complete fertilizer, potassium, phosphorus and nitrogen gave us the best growth.

Cannabis breeding has occupied some of our time, and we have isolated here a dwarf variety. This individual plant shows short branches and very heavy inflorescence. The inflorescence is heavier, especially on the central stem, than that found on the tall-growing variety.

Unfortunately we do not always find the combinations of characters in plant breeding, that are most desired. In this variety we have obtained a plant of much

[3] See JOURNAL A. PH. A., March 1914, pp. 304–314.

better form, but which shows little activity. The variety has been tested for several years, but has never been over 40 percent as active as the Indian drug.

Some work has also been done on Stramonium. A large number of species have been under experimentation. This is a plot of mature stramonium, showing an attempt to simplify the process of harvesting. This drug has been cut with an ordinary mowing machine, the whole plant being taken in, cured, and the leaves removed after the curing process is completed. This shows the operation of cutting. The poor yield is due to the type of soil. It is not adapted to growing this plant. The ordinary farmer will tell you that Jimson will grow anywhere, but we are convinced that it is quite selective in its habitat.

Turning to Belladonna, we have here a section of our propagating division in the greenhouse. These are seed flats in which are thousands of seedlings just ready for the first transplanting. This was an experiment upon germination. The right half was planted with seed which had been treated with boiling water.

Here is a section of cold frames where seedlings are handled. These plants are being removed from the greenhouse preparatory to their setting in the cold frame, or transplanting to the open field, as the case may be. Many of our plants are transferred from the greenhouse to cold frames, beginning the first of March. They can be safely transferred at that time and will withstand the usual hardening off process. Transplanting, of course, comes next and we use the machine shown on the screen. Only one man is used on the machine, since it has been found that one experienced man will accomplish as much and do it better than two.

This is a general view of one of our early breeding plots of belladonna. To the right you will notice plants with white spots on them. They are paper bags, protecting the flowers from cross-pollination. We are very much delighted with one strain recently isolated. Three years' testing has shown it to possess a very much higher percentage of alkaloid than the average type. Unfortunately, as I stated before, we do not always get the best combination of characters. It grows less vigorously and is more sensitive to soil and weather conditions.

This is a view of the harvesting of a belladonna crop. Cutting is done by hand and the entire plant is immediately removed to the drying shed. After partial curing, the leaves and stems are separated. We have grown belladonna strictly as an annual, starting about January and completing the harvest at the end of the season, taking out all the roots.

Henbane is probably more important this year than belladonna, but more difficult to grow. This is one of our early plantings. This planting was made in 1915 and represents an early stage of growth. Here is a later stage, showing the plants somewhat larger, and still another one where the plants have reached a very luxurious stage of growth. A midsummer shower on this plot, followed by a hot sun, converted the entire plot into one resembling a field treated with hot water, practically every plant in the plot being lost.

This is *Hyoscyamus muticus*. This group of plants, consisting of about two hundred, were transferred to the open ground during the month of May, and were all lost, probably on account of the cold, wet weather which followed. This, of course, is the tropical hyoscyamus from which atropine is obtained. It has proved very difficult to grow even under carefully controlled greenhouse conditions. Some few plants have been grown to the flowering stage, but none have so far produced seed. Attempts to cross it with *Hyoscyamus niger* have been unsuccessful.

THE CULTIVATION OF HENBANE.*

BY N. R. MUELLER.

During the past three years much attention has been given to the commercial growing of Solanaceous plants containing mydriatic alkaloids. Of course belladonna and stramonium have been produced in increasing quantities, but it is apparent that the cultivation of henbane offers several problems which differ materially from those encountered in the handling of either of the first mentioned crops.

Stramonium is successfully grown from seed sown direct to the field in spring, while belladonna has thus far been produced from transplanted seedlings. When an attempt is made to transplant henbane seedlings grown in a green-house or frame, the results are discouraging, since the plants seldom recover from the shock of transplanting, and when an occasional plant does survive, it remains stunted and puts on but little growth during the summer. It has been found that injury to the long tap root of the seedling is the cause of this loss which often exceeds 50 percent of the plants set out, hence this method of propagation is not practical on a large scale.

Since transplanting is not feasible, some experiments have been made at the Wisconsin Pharmaceutical Garden[1] to determine the practicability of sowing seed direct to the field. Biennial henbane seed sown in early December 1916, at Madison, Wis., began to come up about May 10, 1917, while some of the same seed sown April 21, 1917, came up May 16, 1917. It is to be noted that the spring sown seed came up only a week later than that sown in fall, and also that it presented a more uniform stand.

In selecting a field for henbane, it is advisable to get a level area comparatively free from weeds, because the slow germination of the seeds, and the low growing habit of the plants, at least until they attain a growth of several inches, makes hand weeding necessary, and this labor as well as that of cultivation is greatly increased in a weedy field. So far as soil is concerned a well drained fertile and friable sandy loam or silt loam gives the best results.

One pound of good henbane seed is sufficient for planting an acre in rows two feet apart. Henbane seed retains its viability several years provided it has been kept dry. Commercial seed which shows a fair percentage germination can be used; however, better results will be obtained from seed which has been collected for planting purposes. If possible, the germination of all drug-plant seeds should be tested before planting, since many ventures have met with failure mainly because poor seed was used. If sown by hand, the seed can be mixed with sand, and dropped into a shallow drill; however, more uniform planting will result if a small seeder is used. The seed should be checked so that one viable seed occurs in every four inches of the row, and due care must be taken to cover the seeds not deeper than about one-fourth of an inch. If necessary, cultivation between the rows to keep down the weeds can be carried on before the henbane plants appear, provided the rows are discernable or have been marked at the ends. Later the plants should be weeded and thinned to stand about four inches apart.

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* Scientific Section, A. Ph. A., Indianapolis meeting, 1917.

[1] The Pharmaceutical Experiment Station, Department of Pharmacy, University of Wisconsin and Office of the Drug-Plant and Poisonous-Plant Investigations, Bureau of Plant Industry, U. S. Department of Agriculture, coöperating.

Insects, particularly the Colorado beetle or potato bug, have been perhaps the greatest factor in discouraging the growing of henbane. The potato bug apparently prefers henbane to any other plant in the same family. Spraying with Paris green and with lead arsenate have shown that the latter poison is most efficient. A dilute spray (1 : 1000) should be applied to the rows when the plants are about one to two inches tall. During the latter part of July when the ravages of the beetle are most severe, another light spray of lead arsenate is usually necessary. Two applications of the insecticide have been found sufficient to curtail the damage from this source. It is advisable to spray the plants several weeks before harvest, and it is necessary that at least one rain should wash the leaves before they are collected.

In order to ascertain whether any appreciable amount of lead arsenate was present on the leaves of sprayed plants, arsenic was tested for according to the method given in the U. S. P. IX. About 200 grammes of green leaves which had been sprayed ten days earlier, and had received one drenching rain, were collected. The surface of each leaf was thoroughly scrubbed with water. After concentrating the 200 Cc. of water used for washing, several tests were made and in each case the trace of arsenic found would amount to less than 0.002 Gm. in each kilo of dried henbane leaves. The arsenic contamination is, therefore, so small as to be negligible.

The crop of leaves should be cut in fall before frost, taken to the drying house and spread thinly either on the floor or in trays, depending upon the available drying facilities. A small amount of heat and a current of air hastens the drying process, and also preserves the green color of the leaves.

Comparative yields indicate that almost twice as much drug can be obtained from the first year's growth than from a similar area of second year plants.

Chemical assays of the leaves of the second year's growth biennial henbane showed a total of 0.07 percent of alkaloids, while leaves of the first year's growth grown from the same seed gave 0.067 percent of the alkaloids of hyoscyamus. It is evident from these assays that the activity of the drug is about the same whether collected the first or second year.

SYMPOSIUM ON DRUG CULTURE.

W. W. STOCKBERGER.

I availed myself of my opportunity as secretary to use that old principle that it is easier to get somebody else to do your work than to do it yourself, so instead of preparing and presenting a paper I suggested this symposium, and I trust that I shall not fail to be rewarded by having a number of those present deliver my paper for me.

The main thesis which I wish to bring to the attention of the Section has already been enunciated by our old friend Dr. J. U. Lloyd.[1] In his comments following the exhibition of the reel of pictures on drug cultivation you will remember that he, out of his years of wisdom and experience, recognized the importance of fully appreciating the resistance to be overcome in every enterprise. I am fully convinced that the commercial cultivation of drug plants at least is not a romantic adventure, but that it is a practical business proposition. It so happens, by virtue of the position which I occupy, that I learn much of what is going on in this country with respect to drug cultivation. What I wish to emphasize is this: That even among the men who are the leaders, or who ought to be the leaders in this subject, there is the most extreme

[1] These remarks have been omitted because they are in substance repeated by this speaker.

divergence of opinion as to what is and what ought to be done. We all recognize that we can not agree fully and completely, but I do not believe that there is any reason for the great difference of opinion with respect to this matter of drug cultivation, that exists even among the members of this Section; and what I wish to suggest for your consideration has already been foreshadowed by Dr. Lloyd when he said that he wished we might have a circular which would put this matter in concrete, crystallized form, so that uniform information could be sent out by all of us. Now that is the point that I wish we could reach to-day. We ought to agree on a definite general policy. Of course we may not all agree on details because each man wishes to have his own opinion; but the general policy toward drug cultivation I think should be agreed upon.

Now to illustrate: Either there is an opportunity for thousands of people in this country to make enormous profits with little or no work or else that opportunity does not exist. Now which way is it? That is one of the points upon which there is difference of opinion. The opinion has been expressed that we should encourage every individual who expresses an interest in the cultivation of drug plants to go into the business. Even though ninety-nine out of a hundred fail—so this opinion goes—the end justifies the means if one makes a success. Now that is a principle to which personally I am diametrically opposed, because I see no justification for lending our encouragement to ninety-nine failures, with the meagre hope of one success. Moreover, if there is any legitimate place for the future development of drug cultivation, and if we are to approach those ideals which have been so splendidly presented here this morning, according to which the products of drug cultivation will be gathered and handled under controlled conditions and properly tested with respect to their standard of excellence then we cannot afford to jeopardize the development of that side of this proposition by encouraging a large number of people to go into the business if they are going to fail, because that will bring the whole proposition into disrepute. And so it seems to me that this is another point upon which there should be no difference of opinion.

Another point upon which there is disagreement is the opportunity which exists for commercial drug growing. The thought came to me one day when riding on a train to be a little spectacular for once by presenting graphically the contrast between the opportunity for the American people in this enterprise of drug growing and their opportunities with staple crops. For the drug crops I chose belladonna and assumed that the entire requirement of this country could be grown on say, three hundred acres. I chose corn as the staple crop for comparison although I realized that when illustrated graphically, the line representing the acreage of corn would be very much longer that that for the acreage of belladonna. When I came to calculate the length of my two lines I found that if I used one thirty-second of an inch to represent the acreage of belladonna, the line representing the acreage of corn would run down the street for almost half a mile. Now this question of relativity is another one of the important things, it seems to me that we ought to appreciate more fully. The man who publishes a magazine article on drug growing and says to thousands of readers, "Here is an opportunity," may tell the truth, but he misses the important point. What may be an opportunity for a few individuals may be of no significance whatever when addressing the American people, among whom we number our farmers by the millions. Likewise the suggestion that $4000.00 or $5000.00 can be made from a few plants of belladonna or golden seal or ipecac in a back yard, or some such proposition as that, is misleading to say the least, but strange to say there are thousands of people who believe this fiction and straightway set out to secure material to plant, in the hope that they will obtain these great returns for their efforts.

Just a few weeks ago I sent out a circular letter to every person that I could learn of in this country who was growing belladonna, or who was supposed to be growing belladonna commercially. I am not at liberty to give a detailed abstract of the replies received, although I wish I could, for your edification. Suffice to say that out of a long list to whom I sent this inquiry not more than one percent reported that they had any degree of success at all. A very large number reported total failures, and as they had purchased belladonna seed with which to experiment at five dollars an ounce, they were naturally disappointed. Some of us receive hundreds of letters from people who are anxious to increase their income. They have read glowing stories about the wonderful returns from growing medicinal plants, and have invested five or more dollars in belladonna seed, although they possibly never grew any plants in their lives. Their faith would move mountains but it won't grow belladonna.

Another point upon which I think we should agree more closely concerns the marketing of the products of drug cultivation. Much of our talk regarding the commercial cultivation of drugs fails entirely to take into account the question of marketing. It is all well enough to say to the farmer, "grow corn, or cotton, or wheat," because if he gets a crop there is always a market right at hand. But when he grows belladonna how is he going to sell it? He has been told that the druggist or the manufacturing pharmacist will buy it. But his market will be in a distant city, and he will have to advance the freight and then accept whatever price the consignee may choose to pay. Few of these people know how to prepare their drugs to meet the usual market requirements, and to the problem of disposal ninety-five percent of those who are thinking about this enterprise may never have given any thought at all. They assume because staple crops have a ready market that it will also be easy to market their drug products. I do not wish to discredit the worthy motives which actuate many persons who are urging drug growing. All that I ask is that we see both sides of the question; tell the people the truth in the matter and point out the difficulties as well as the attractive side of the proposition.

There has been, as some of you know, a movement on foot for nearly a year to form a National Drug Growers' Association. It is recognized that there is need for those interested in drug growing to get together and adopt a uniform policy. Such an association may be the means by which that may be brought about. I think perhaps it is a question for debate whether we wish at this time to attempt anything so ambitious as a National Association of Drug Growers. I believe that we can do much as an association either through the Scientific Section, or better, a committee of this Section, composed of men who are interested in the cultivation of medicinal plants. Such a committee could formulate a definite policy and secure the necessary publicity for the same. It seems to me that this is one of the questions we should think about very seriously today.

As most of you know, I am very much interested in the subject of medicinal drug gardens. I believe in these gardens thoroughly, and am fully convinced that they are a wonderful educational stimulus. I shall not try to name all the recommendations they have, since I talked upon this subject at the Atlantic City meeting last year. Since then a number of other gardens have been established and some of the older ones have been much extended. We need to encourage these gardens for their educational value, but it appears that the real function of the School of Pharmacy drug garden is misunderstood by a large part of the public at large, and is not looked upon as an aid to education, as a means of stimulating research and furnishing materials for use in solving many of the problems of materia medica, but, on the contrary, they are believed to be established for the purpose of helping people to make money. The commercialism which seems to act as a colored screen before the eyes of some who look at this phase of drug growing should be swept aside and our educational drug gardens viewed in the white light of reality.

Our drug gardens now form a recognized asset of pharmaceutical education and their beneficial effects are very apparent at a number of our educational institutions, but lack of unity of purpose or lack of agreement as to the scope and function of these gardens will sooner or later bring us all into disrepute with the public.

In this rambling way I hope I may have supplemented somewhat the thesis laid down by our venerable colleague, Dr. Lloyd, when he said we ought to crystallize the facts about drug growing in such a way that we can all tell the same story.

EDWARD KREMERS.

I want to second most heartily the suggestions made by Dr. Stockberger. I could weary you with a long list of special illustrations supplementing his excellent remarks, but I shall not do so. I want to emphasize, however, that if we are not boosters we need not necessarily be knockers. Dr. Stockberger certainly is not a pessimist on the subject of the cultivation of medicinal plants. Neither am I. But to hold out hopes which will lead to nothing, but which will injure the entire scheme of the cultivation of medicinal plants in this country, is all wrong.

I need but remind you of the hopes that were held out to the farmers of this country for the production of industrial alcohol. According to the newspaper accounts it was to be possible for any farmer to go to his barnyard and pick up the refuse that the cattle would not touch, and convert that into alcohol with which to illumine his house, and to run his farm machinery—also his Ford. You know that nothing has come of that, and it seems to me we have occasion to

congratulate our country that the person who is looking after the cultivation of medicinal plants at Washington is not guilty of holding out any false hopes to the people.

The subject is so large that it is impossible for me to touch on many phases thereof, but before touching on a single phase let me call your attention to the degree of specialization which has developed in the American Pharmaceutical Association in the last twenty-five years. The growth of our Section is an indication of that degree of specialization. There was a time when the members of the American Pharmaceutical Association came together and all talked about the same subjects. There is no thought of doing that to-day. Now we are confronted with the feasibility of either establishing a new section on the cultivation of medicinal plants, or organizing a committee within this Section that is to look after the cultivation of medicinal plants. The problems that confront us in the cultivation of medicinal plants are so numerous and so special that even the scientists of the American Pharmaceutical Association alone may not hope to cope with them.

I want to emphasize the statement made by Mr. Fuller, namely the need of coöperation. At the large universities the men who are interested in the same lines of work, say chemistry, naturally try to get together for purposes of conference. That is very important. And yet when I think of those who are most helpful to us in the cultivation of medicinal plants and indeed in all of our problems in the pharmaceutical experiment station, I do not necessarily think of the members of our local chemical association who are working in the same building or other buildings on the campus; I do not even necessarily think of some of the members in the school of medicine but the colleagues of whom I think first of all are the professor of experimental plant breeding, of the professor of entomology, of the professors in the horticultural department and those in the plant pathology department. All of these men are coöperating with us and giving us most helpful assistance. Take, for instance, the subject of plant breeding. We have been requested by the Office of Drug-Plant and Poisonous-Plant Investigation in Washington to make a special study of stramonium. We began by studying the literature on the subject, and several years ago we issued a bulletin in which we called attention to all of the previous work as well as our own. We issued that bulletin for the reason that we wanted to put the tombstone, as it were, on all that had been done before, and we started out anew. It was the professor of experimental breeding who with his assistants came to the rescue. They are coöperating with us to-day.

Something has been said about the quality of drugs. Take for instance stramonium. The U. S. P. requirements, I think, came down from 0.35 to 0.25 in the alkaloidal requirements—not the present revision, but the previous revision—because the drug of 0.35 alkaloidal strength could not be obtained. It was a matter of chance that we obtained a plant containing 0.45, or, say, 0.40—whatever figures I select here make no differences; the actual figures on record would not be any more true than any figures I put down here (illustrating on blackboard). We took the seeds of that plant in the hope to get pedigreed material. Suppose we have a thousand seeds from one plant. We sow these seeds, we thin out our plants and we have a hundred plants left. Of these hundred plants we select twenty plants for seed, for purposes of propagation, and we test the leaves of those selected plants. We then find, for instance, that one plant assays 0.41, the next one 0.37, the next one 0.32, the next one less, whatever it is. We find that most of the plants we have assay low, 0.09, or something like that (illustrating). Now first of all the plant from which we have selected seed yielding a drug with 0.40 alkaloid is a composite, with strains of ancestry going back we know not how far. Now what we do is to eliminate some of those strains, and we take, for instance, this plant here with 0.41 percent alkaloid content in its leaf (illustrating). The next year it is again a matter of chance what we get. Out of a thousand seeds we will get possibly a hundred plants. Out of the hundred plants we select possibly twenty for assay.

We may not get a single one as high as 0.5, but again we may take the highest, let it be 0.3 and we propagate. In doing this we eliminate certain ancestries as it were more and more. Whether we can carry the process to a successful conclusion is another question. But I do not want to pose as an expert on the Mendelian law of plant breeding. I simply wish to point out to you how the experimental plant breeder, whether he is trained along plant or animal lines, is helpful to us, and how we, the chemists, have to coöperate with him in connection with our assays in finding out the strains that we want.

Let us next take up the subject of cultivation. I was very glad that you had several illustrations of orchard cultivation illustrated to you. I am not going to dwell on that and how that should be conducted.

Another important matter that might be spoken of is the cultivation of Monarda. After a number of failures we seem to have hit upon the right plan. Under some conditions it will not germinate. However, Prof. Beal demonstrated that the same seeds with which we have been experimenting, develop out in the open in Florida without any cover crop, indeed under conditions, as he told me, that in our latitude would have buried the seed forever. Hence it may be that under other conditions more favorable Monarda may be raised more readily than with us in Wisconsin. Of the several cover crops that we have tried out, winter rye has been most successful. Now after the rye has been harvested, the plants are three or four inches high, thousands of them, on a small piece of ground.

Incidentally you may be interested to know that in connection with the rye cover crop we inoculated the rye field with ergot, and we obtained a very nice crop of this fungus. However, we did not harvest it, not because we did not want to, but because our inexperience with both rye and ergot caused us to lose the entire crop. I thought the rye was not quite mature and wanted to wait until it was mature. So one morning when I came out to the field, with a high wind blowing, the sclerotia of the ergot were being blown off, and by 4.00 o'clock in the afternoon not a single sclerotium was left. But although the patient died the experiment was a success.

Attention has been called to the cultivation of henbane and the difficulties associated therewith. You have been told that the cultivation out in the open has been successful. The additional point that I wish to make in that connection is this: When you sow henbane out in the open you naturally sow many more seeds than you expect plants to harvest. As a matter of fact we have to thin out the plants. Now instead of going into the field with a hoe and cutting out those plants and letting them wilt, we have tried the thinning out by hand, and we are raising young henbane plants as a by-product as it were. The waste plants are not thrown away. Neither are our excess digitalis plants thrown away. Whether they will reveal the same efficiency as the mature plant, I do not yet know. We have here another of those numerous tricks of the trade that you have to learn when you go into the cultivation on an economic scale.

I enjoyed very much indeed the films from the Washington Experiment Station by Mr. Fuller, but I want to caution you against one thing. Certainly if the temperature, as he states, was 120 degrees one day, the workers do not keep up that rate of speed in picking leaves that was indicated on the films. That is a very important economic problem. We have found in picking choice belladonna leaves that the picking is half of the expense.

So when it comes to certain medicinal plants and the drugs to be obtained therefrom, we have to get away from many an old pharmacopeia notion. I remember it was not many decades ago that the U. S. Pharmacopoeia defined oil of peppermint as the oil distilled from peppermint. Then when you looked up what peppermint was in the Pharmacopoeia you found it defined it as such and such a drug. Well, not a pound of peppermint oil was distilled in this country or anywhere else according to that definition. Mr. Allen of London once complained to me that he was trying to distil cinnamon oil from Ceylon cinnamon, as demanded by the British Pharmacopoeia, and that the oil cost him $20.00 or $25.00 a pound or more, to say nothing about the profit. Now some of those ideas we have to get away from and the sooner the Pharmacopoeia gets away from some of them the better.

In the case of digitalis we have had the difficulty that just before harvesting we might have a heavy rain. Our soil contains a very fine clay which is thrown up against the hairy surface of the digitalis leaves, and it is extremely difficult to remove it. You might brush every leaf separately and not remove every particle of clay. You can readily see what such a digitalis leaf would cost if you tried to make it true to the Pharmacopoeia. Digitalis leaf should not contain more than ten percent of ash, but the choice digitalis leaf which we have raised in our garden contained as much as twenty-five percent of ash. That is, the apparent ash content was such. However, only ten percent of this were really ash; the remaining 15 percent were clay. So in supplying an eastern hospital with a No. 20 powder of digitalis, we examined the powder as we obtained it by means of a set of analytical sieves. From a kilo we got about one-half kilo of No. 20 powder. We got, I have forgotten how many grammes, of 30, 40, 50 and 60 powder up

to 100. Whereas our No. 20 powder contained 10 percent—that is, represented the drug with its true ash content—the finer powders contained an increasing amount of ash until the finest powder which consisted of 75 percent clay. Now that is a simple mechanical means of improving a drug. Whether, as our friend, the late Martin Wilbert, suggested, the clay might have an occluding effect on the active constituents as well as act merely as a mechanical diluent, has not been determined. That is a problem that we shall have to work on.

Just one other word and I will stop. So far I have spoken simply about the production of the plants themselves and drugs from the plant. When it comes to the production of medicinal or pharmaceutical chemicals from the plants, we have other problems to contend with. Let me take the illustration of the Monarda again. Monarda usually yields about five-tenths of one percent of volatile oil. A ton of green material therefore will yield about ten pounds of oil. You can therefore imagine how large an area you will require to supply the United States, or simply the Rockefeller foundation with the amount of thymol that it uses in the hook worm campaign. Now that oil assays 50 percent of thymol, according to the assay method. A member of our Association was surprised this morning when I informed him that last year we sent out over 100 pounds of Wisconsin thymol. More than that, he was surprised to learn that none of it had been rejected, but that the purchasers accepted it as A No. 1 thymol. However, we never succeeded in getting the 50 percent of thymol out of that oil. Working with hundreds of pounds we accumulated enough mother liquid from which, by very careful manipulation last winter, using winter temperature, we removed practically all of the thymol. Such effort would not pay commercially, but we wanted to find out what was the cause of our deficiency in manufacture as compared with the assay. We were rewarded by finding considerable carvacrol, an isomer of thymol, which however does not crystallize at room temperature. Here you see we have an illustration of how careful we must go ahead. You may sit down and on the strength of the assay figure out with scientific accuracy, as you think, just how many acres of Monarda you need in order to supply a certain amount of thymol, but when it comes to the practical economic problem, the production of the actual thymol, you may find that you get left.

H. C. FULLER.

There is one thing that seems to be emphasized, and that is the unanimity of opinion and apparently the spirit of coöperation that is manifest. And coöperation can do a great deal.

Mr. Miller's statement about cannabis is specially interesting. He can grow cannabis and allow it to come to maturity and go to seed. He can use it in his own drugs and it is all right, and that is perfectly proper, but if we, as a commercial enterprise, attempt to grow cannabis that way, allow it to come to maturity, let it seed, and try to dispose of it, nobody would buy it from us. In fact, we would be liable to have our shipments seized by the United States Government, because they would not comply with the Pharmacopoeia as regards certain characteristics. The drug may test up to the proper physiological strength but it has too many seeds.

Another thing, in culling out our male plants during the season, I have had them saved from time to time; had them examined by assay, the same as I have done with the female plants, and by simply labeling it "cannabis" the pharmacologist reports back that the male tops are better than the U. S. P. and the female tops are equal to the U. S. P. But I can not sell the male tops for cannabis. Nobody will buy them. Now that is just one instance that touches those of us who are interested seriously in drug growing—and I am really optimistic regarding drug growing if it is properly done. I believe coöperation can do a great deal, but there are many other problems that confront us, and ought to be very seriously considered. There is the question of tariff, the question of the attitude of certain bodies antagonistic to botanical drugs which are used in large quantities in certain medicinals, etc. I am going to make a motion that a committee be appointed from this Section, looking to obtaining closer unanimity of opinion and presentation of information regarding this very important problem, to be a permanent committee composed of sufficient members to be representative, but not too many members to be cumbersome, to handle these various problems which have been presented today so ably by the different speakers.[1]

[1] See December issue, pp. 1097–98, also p. 860, October number, 1917.

R. A. LYMAN.

I want to assure Mr. Fuller that there is in this room a spirit of coöperation, but I can not say that there is a spirit of unanimity. I am going to take just a few minutes of your time to state the position of the educational garden, which I represent.

I also want to call the attention of Mr. Fuller to this fact: He made the statement that it took a botanist to grow good drug plants. In my institution we have a young Englishman who is neither a botanist nor a scientist, and yet he can make things grow like nobody else has ever been able to make them grow.

I am interested in this matter chiefly for this reason, that drug plant cultivation is full of interesting problems, and it furnishes, as I see it, one of the finest avenues to interest young men of brains to enter the profession of pharmacy, and I do not propose to have anybody take that advantage away from me. I recognize the position of the educational garden. It is primarily for the purpose, to begin with, of helping to teach the students the subject of pharmacognosy. It is a laboratory; it has made a living subject out of pharmacognosy and I do not know why it is not perfectly proper for a great educational institution to attack these problems. For my part I do not propose to permit the Department of Agriculture of Nebraska to concern itself with the great problems of agriculture in our state, and not have the opportunity, that my own college of pharmacy in my own state should have, of rendering service to the druggists of Nebraska.

This is an educational garden; it must become a research garden. Just for example, I do not know why I should not be permitted next year to interest myself and my students in the following economic pharmaceutical problems: I have discovered this year that when henbane and potatoes grow side by side, the potato bug leaves the potato every time for the henbane. We in Nebraska raise millions of bushels of potatoes. The insecticides and the labor required for their application costs the farmers of Nebraska thousands of dollars. I do not know of any reason why I shall not next year, as a problem of my institution, have my students work upon an acre of potatoes with a row of henbane around it, and determine the cost of production of that acre of potatoes compared with another acre of potatoes that is not surrounded by henbane. If the potato bugs will leave those potatoes and go to that henbane, the student can apply insecticides to that row of henbane, at much less expense of material and labor. That is my problem.

Now I appreciate the position of everybody who takes the opposite view, that we should not encourage the cultivation of drugs in the way it has been encouraged. I rather admire Dr. Stockberger for taking the position that he has in discouraging the venture without the proper knowledge, because that has saved a lot of people from financial loss. But I must determine what I shall do in the State of Nebraska. None of these men in the Department of Agriculture or any of these other men in gardens over the country can tell me what I can do in Nebraska, because they have told me I could not raise belladonna and I could not raise digitalis, and the very things they told me I could not do, I set out to do and I did it. If anybody wants to stimulate me to get into a particular field, just let them tell me I can't do it.

I have found that young men have become interested, from this garden work, in the growing of drug plants, and every year as these young men go out, some of them graduates and others first year men and second year men, they say, "Dr. Lyman, can I have a few digitalis plants, a few belladonna plants, a few of golden seal, to start in my garden?" I always say yes, and I give them to them, and they take them out and start them. Most of them fail the first year and they come back to me and say, "My plants were no good," and I say "Well, here are my plants," and we talk the matter over and we find out what the difficulty is. Of course, sometimes they have simply stuck them in the ground and thought they would grow like potatoes—and they won't—and so they have tried again, and as the years have gone by I have found these men in different parts of the state growing their own little garden. Now it is of no commercial importance to those fellows, but they enjoy it. And, in addition to that, the people of that community, every one of them, I have found are interested in that young man, because he has got ideas that other people have not, and he is the coming druggist of that locality, and it is the best advertising proposition that was ever put before a community for a particular druggist; and I do not think that the people of Nebraska will lose any money because of the fact that this policy has been conducted in the University. From the efforts of these young men the people

of a community learn that the growing of drug plants is a work requiring endless labor and will undertake no foolish experiments. They learn without expense to themselves that the growing of drug plants does not mean an easy road to a fortune. Two years ago a freshman came to me in the spring and said, "Dr. Lyman, over here in Oak Creek Valley I and another freshman have rented 320 acres of land to raise drug plants. Now I have come to you to see what we shall plant." I said, "You come with me, young man," and out in the garden we went; and when we got through, he said, "Well, it isn't too late to plant corn."

J. U. LLOYD.

It seems to me one feature has been left out, and I think Dr. Stockberger will agree with me that it lies with him to utilize this for the advantage of the American people in the cultivation of drugs. At the meeting of the American Pharmaceutical Association in Kansas City, Mr. J. C. Huber of Fond-du-Lac, Wisconsin, the first man that tried to raise ginseng in America, came to me, I was chairman of the Committee on Papers and Queries, and said, "Professor, I am going to attempt raising ginseng." Now listen, we had depended upon senega from West Virginia, from the mountains of that state, and we had been getting little spindling plants the size of a knitting needle ever since America was discovered, and two years before that they found senega in Wisconsin with tops the size of your fist nearly, so large that we questioned whether it was senega or not. I said to Mr. Huber, "why don't you raise senega? You know senega will grow in Wisconsin; why concern yourself with the growing of ginseng that is native to the forests of Kentucky and Virginia?" Well, he went ahead and failed on ginseng when he could have succeeded with senega. On the old farm in Kentucky there has not been a crop of hemp raised for seventy-five years, and they can't kill it. Every fence corner on the place comes up with hemp. It grows naturally down there; it can be raised elsewhere, but you can not help raise it in Kentucky if you get a start. Out in Washington they raise digitalis, and it is best on the hillside. It has become a weed, and a pest to the farmers on the hillsides of Washington. How can a grower elsewhere compete with that digitalis? When they write to Dr. Stockberger from different parts of the country, he can say to the people in the South, "Yes, you can raise camphor; you can raise so and so down South, but do not trouble about drug plants that grow best in the North." Locate the part of the country where the plants will or do grow, but do not try to raise plants where they do not want to grow. To study the parts of the country where these drugs can best be used and where they will grow naturally will be a great help. I believe that is one of the opportunities in the direction of raising drugs, and there will be found a place in the United States where they can raise henbane but we must find the best locality. Mr. Fuller is the man who can make a success of drug growing. Manufacturers can hire trained men to go to the field, and keep an account of the expense, and probably supply themselves, and be sure of a supply for years to come. But Mr. Fuller, as I understand it, is in the commercial side of the business and he will make a success of it. He is the man who may sometime have a digitalis field out in the State of Washington, a senega field in Wisconsin and a hemp field in Kentucky; just as canners locate their different plants in the sections of the country best suited for growing their supplies.

To this I will add that when I entered the room at the meeting of the American Pharmaceutical Association (1888), in Detroit, Dr. Charles Rice took me by the arm and said: "Lloyd, I want to show you something that is of exceptional interest." He took me to the part of the Exhibition Display, and introduced me to Mr. A. M. Todd, of Ottawa, saying: "Lloyd, I want you to study this peppermint display. Mr. Todd is on the right track. He will make a success of peppermint growing, thus giving to America another home production, improved by cultivation." For several successive years thereafter, Mr. Todd corresponded with me on the subject of the peppermint problem, sent me specimens of the oil, as well as of the menthol obtained therefrom, finally making a magnificent success of the peppermint industry. Now to the text. If these experiments had been made in an inhospitable country, soil and climate, utter failure would have resulted. A magnificent opportunity lies before America, by reason of the fact that we have in America every climate, soil and condition necessary for the introduction of all that America needs;—mountain, valley, rich woodland and desert are at our command. And, all America will profit by such wise guidance as Dr. Stockberger offers and Dr. Fuller supports.

L. E. SAYRE.

I have been obliged to depend upon the United States Government and upon the gentlemen who have interested themselves in raising medicinal plants, in order to get authentic material for experimental work, and I want to say one of the best things which the United States Government has done with regard to that has been to stimulate an interest in this subject and to give us, who are in the educational institutions, material which we can operate with.

Do not be discouraged if ninety-nine percent are failures. I heard a paper read by one of the best business men in the country the other day in which he said that from seventy-five to ninety percent of the business men were failures, and he proved that by statistics. Nevertheless, do not be discouraged. I advised a young man to raise golden seal some five years ago, and to-day on a half-acre farm he is making two thousand dollars a year.

W. W. STOCKBERGER.

I wish to say one more word, I think we must protect from the results of their ignorance the impecunious man or woman who can not afford to invest even five dollars in a small quantity of seed and then get nothing from it. On the other hand, it is the duty of the educational institutions to carry out experimental work in their drug gardens since the facts secured will ultimately have great value for the people in the locality where the garden is located, and thus a double purpose will have been accomplished. I should like to see a great big drug garden in connection with every School of Pharmacy, and to act on Dr. Lloyd's suggestion and begin to work out individual problems. Nobody will try to rob you, Dr. Lyman, of any part of the field of work which you are so splendidly developing and I must say that no word that I have heard for a long time sounds so good to me as Dr. Lyman's statement that the drug garden is the problem of the School of Pharmacy.

WAR EMERGENCY FORMULAS.

Under above caption F. A. Upsher Smith presents, in the *Northwestern Druggist* for February, the timely subject of displacing glycerin and sugar in many of the preparations of the U. S. P. and N. F., and suggests work of investigation relating thereto. The statement made, "that allowing 50 pounds of glycerin and 500 pounds of sugar for each of the 40,000 drug stores per year, we arrive at an estimated yearly consumption of two million pounds of glycerin and twenty million pounds of sugar," is sufficient for emphasizing the possibility of conservation. In the January issue of the JOURNAL OF THE A. PH. A. will be found a related article by Prof. Curt P. Wimmer.

Mr. Smith has brought the matter to the attention of the U. S. P. Revision Committee and the N. F. Committee. A War Emergency Addendum to the *British Pharmaceutical Codex* has been published, containing formulas for the preparations in which glycerin and sugar have wholly or in part been displaced. There are many preparations of the U. S. P. and N. F. in which sugar and glycerin are employed because under normal conditions, no base, solvent or adjuvant is better or more economical; war-time conditions have changed this phase, and the proposition is now presented from the view point of conservation, provided the medicinal value of the active constituents is maintained.

Unfortunately, no one can foretell the duration of the war. France and Italy, before the war, were nearly self-supporting relative to sugar; the United States, Canada and England were importing countries. It has been determined that during this year the United States must cut down its consumption by 15 percent. Relative to glycerin, the situation is perhaps more serious. We lacked in preparedness for the war; we now know that if the war continues the shortage of the two important products mentioned will become more pronounced and presents the timely question of preparation for the emergency. There are question that will be involved in the proposition, namely, official recognition of the *succedenea*, and standards for the same.

The subject should be discussed in Branch meetings, by local associations, and in joint meetings of physicians and pharmacists. Care should be used in selecting substitutes so that no shortage will be created of these products, as this would only be a shift instead of relief.

SOLVENTS IN PHARMACY.*

(Continuation of "Precipitates in Fluid Extracts," 1885.)

(The paper was written in 1885, see Introduction, p. 940, November 1917.)

BY JOHN URI LLOYD.

PART II.

Solvents Considered. The solvents considered in this series of experiments are (excluding acids and alkalies) those that appeal as being of possible use in plant pharmacy, as solvents or excluders, either alone or mixed. They are numbered herein, successively, and may, for our present purpose, be most rationally classified by group solvent relationships. Three classes, then, result (Table I), as follows:—

TABLE I.

1st,	Glycerin,	
2nd,	Water,	
3rd,	Alcohol (U. S. P. 1880),[1]	*Class 1.*
4th,	Methyl Alcohol.	
5th,	Acetone,	
6th,	Chloroform,	
7th,	Amylic Alcohol,	*Class 2.*
8th,	Acetic Ether,	
9th,	Sulphuric Ether (U. S. P. 1880).[1]	
10th,	Benzol,	
11th,	Carbon Disulphide,	
12th,	Benzin,	*Class 3.*
13th,	Turpentine Oil (rectified),	
14th,	Liquid Petrolatum.	

Class 1—Glycerin, Water, Alcohol and Methyl Alcohol. The members of Class 1 mix[2] with each other in all proportions, regardless of order of mixing them. It is impossible to make any combination that is not transparent. Were it not for the erratic acetone of Class 2, which refuses to mix with glycerin, this substance (acetone) might also be included in Class 1, because acetone mixes freely with the other members of this class. The members of Class 1, when pure, are either odorless or possessed of no very marked odor. Excepting glycerin, they evaporate readily and are easily distilled.

Class 2—Acetone, Chloroform, Amylic Alcohol, Acetic Ether and Sulphuric Ether. The members of Class 2 mix with each other in all proportions. It is impossible to make any combination of any or all of these substances, that is not transparent. The members of this group are all volatile, and excepting amylic alcohol, which boils at about 270° F., may be easily distilled. They are all possessed

* Continued from p. 949, November 1917. Thanks of the author are extended to Miss Eda Van Guelpen for drawings of cuts presented, to Miss Margaret Stewart for editorial oversight and to Miss Anna Longstreet for typewriting care.

[1] It is essential that liquids in exact accord with those used in the experimentation originally instituted be employed. Hence, neither Alcohol U. S. P. nor Ether U. S. P. 1910 is now admissible. (J. U. L., 1917.)

[2] Where the term *mix* or *miscible* is employed, perfect solution is to be understood. All these liquids may be mechanically mixed by agitation or emulsifying processes.

of marked odors, and these odors, beginning with acetone which is less decided than the others, are successively pleasant, but upon reaching sulphuric ether they become unpleasant, that of amylic alcohol being disagreeable.

Class 3—Benzol, Carbon Disulphide, Benzin, Turpentine Oil and Liquid Petrolatum. The members of Class 3 mix with each other in all proportions. They are, excepting liquid petrolatum, volatile at ordinary temperatures, some of them being very volatile. Excepting benzol and liquid petrolatum, they are all possessed of disagreeable odors.

General Remarks on the Three Classes.

Considering these fourteen liquids in the order given, it is found that between the extremes no solvent affinity whatever exists, but as we progress down or up the series, affiliation increases.

Thus, glycerin, which mixes clear with any member of Class 1, is practically indifferent to all of Class 2, and will not mix freely with any member or combination that may be made of Class 3.

Water is indifferent to all the members of Class 3. Of Class 2 it mixes in all proportions with acetone, takes up of sulphuric ether largely, and is indifferent to the other members.

Alcohol mixes freely with all the members of Classes 1 and 2, and is miscible in varying degrees with all but liquid petrolatum of Class 3.

Methyl alcohol mixes freely with all the members of Class 2, with one member (benzol) of Class 3, and is very friendly towards the other members of the third class. Indeed, the only practically indifferent liquid of the entire list to methyl alcohol is liquid petrolatum.[3]

Thus it is seen that a progressive relationship seems to exist between the members of Class 1, increasingly for certain members of the other classes, as we progress from glycerin to methyl alcohol.

When we step into Class 2, we find that the first member, acetone, is remarkable in that it mixes freely with all the liquids of the entire list excepting the extremes, glycerin and liquid petrolatum. It has no other incompatible.

Next, chloroform is possessed of fully as marked affinities, exclusive of the first two members of Class 1, water and glycerin, with which, however, it very slightly affiliates. Chloroform and amylic alcohol mark the central feature in the list, for from these two as we progress towards the extremes we find increasing antagonisms. Amylic alcohol has practically the solvent relationships of chloroform. It mixes partially with liquid petrolatum, and freely with all the other liquids excepting water and glycerin, in each of which it is sparingly soluble. Begin with amylic alcohol and pass to Class 3. Adding successively the same bulk of each liquid, and shaking after each addition, the liquid remains transparent to, and including, liquid petrolatum. Pass now in the other direction and add to the foregoing mixture each liquid, successively, to the water. Constant transparency results, but the water immediately decomposes the mixture, the line of division being remarkably changed from what might be anticipated. (See Process of Establishing Solubilities.)

[3] In these experiments equal amounts are shaken together. Liquid petrolatum and methyl alcohol separate, leaving the surface film between them about where it would be in case neither dissolved the other. See "*Process of Establishing Solubilities.*"

Acetic ether will not, in equal amounts, mix with any member of Class 3, and with only two of Class 1, water and glycerin being with it immiscible.

Sulphuric ether, U. S. P. 1880, mixes freely with all members of Class 3 excepting liquid petrolatum.[4]

Passing now to Class 3 we strike first benzol, the most cosmopolitan member of that class. It affiliates[5] with two members of Class 1 (alcohol and methyl alcohol), with all but one member of Class 2 (acetic ether), with which it unites one to two parts. In this respect it is an exception, for any other member of the entire list that freely dissolves sulphuric ether, will also dissolve acetic ether freely. It refuses to unite with water and glycerin in any proportion, thus indicating the relationship that, in our present study, places it in Class 3.

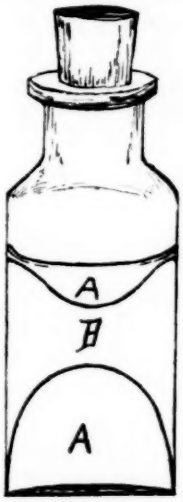

FIG. 4.

A,A—Carbon Disulphide.
B—Glycerin. Position assumed on shaking, Fig. 5. Note meniscus, lower A, reverse of Glycerin (A), Fig. 5.

FIG. 5.

A—Glycerin.
B—Carbon Disulphide. Position assumed when carbon disulphide is poured carefully on the surface of the glycerin, narrow container.

The second member of Class 3, carbon disulphide, mixes freely with all but one member (acetic ether) of Class 2, and mixes with only one (alcohol) of Class 1.[6]

[4] This is important,—indeed, one thought of the writer is the opportunity of establishing standards of purity by behavior of mixed liquids, a very entrancing research. For example, the separation of sulphuric ether (U. S. P. 1880) from liquid petrolatum, is due to the water contained in the U. S. P. ether, 1880. Water-free (Squibb's Anhydrous) ether mixes with all the liquids of Class 3. In order to parallel the experiments (1885) in which sulphuric ether U. S. P. 1880, specific gravity 0.750, was used, ether of the same strength must be employed. This is a very delicate test for water in ether. J. U. L. 1917.

[5] Mixes in equal amounts, by measure.

[6] In this connection, the contact meniscus of three of these,—methyl alcohol, water and glycerin—is fruitful as regards their curvatures, these distinctions being part of my study in connection with capillarity. The mixture of carbon disulphide and glycerin is remarkable because the lighter liquid, glycerin, s. g. 1.250, if the cylinder be small in diameter rests beneath the heavier, CS_2, s. g. 1.268, when the glycerin is added first (see figures 4 and 5). The cause of this phenomenon, a most interesting study and very fruitful, in its relationships, is studied in another place (not yet published).

Benzin, turpentine and liquid petrolatum stand practically together in their affinities. None will mix with any member of the first class. All mix freely with the three first members of the second class,—acetone, chloroform and amylic alcohol. They all dissolve in acetic and sulphuric ether, but vary somewhat as regards proportion. Liquid petrolatum is separated from the others of this (3rd) class, in that it is odorless, and is not volatile at ordinary temperatures. Thus liquid petrolatum, terminating Class 3, stands isolated as does glycerin in heading Class 1. In all respects these two liquids are so antagonistic that it may be said that from the angle we now consider them, they are the antithesis of each other.

Solutions of Solvents and Mixtures of Neutral Solvents.

We are now led to an unmentioned and yet very well-known phase of the act of solution that confronts us when we consider the separates of the three classes.

Mix any two miscible solvents, *e. g.*, alcohol and water, and, as has been stated, the solvent action of the resultant liquid is different from that of the original. For example, equal parts of water and alcohol, mixed, will not dissolve as much salt and shellac as would either alone (water, the salt,—and alcohol, shellac). Add to a mixture of water and alcohol, successively, other affiliating liquids, and with each addition the solvent power of the product is altered. Change the proportions of the ingredients and, it becomes possible to make a solution of one liquid in another and then, by adding a third liquid, to throw more or less of one or the other constituent (perhaps both) of the first mixture out of solution. In other words, to precipitate it.[7] In like manner other liquids may be added, and thus produce precipitate after precipitate, successively, all perhaps finally redissolving, when the strain is broken by the addition of an affiliating liquid. Each new mixture becomes a new menstruum, each new menstruum is a solvent having distinct affiliating qualities, as is shown by the disappearance or increase of the successive precipitates, and also indicated by the shifting of the line of demarcation as each liquid is added. These qualities present great opportunities in manipulative pharmacy.

Mediators for Uniting Immiscible Solvents.

In mixing neutral solvents we are led to results that occasionally seem to conflict with our theories, if the characters of separated ingredients, as aforenamed are alone taken into account. It is possible to make combinations that will enable liquids of opposite characters to coalesce. We can, for example, by using a mediator, unite some proportion of any member of Class 1 with any member of Class 3.

Thus, if two parts of acetone be mixed with two parts of glycerin, the mixture will at once separate into two layers, about equally divided. Add now one part of methyl alcohol and agitate;—the liquid immediately becomes transparent, forming a single menstruum. The methyl alcohol acts as a mediator, affiliating the three into one, which, however, has a different solvent action from any of its constituents.

Again. Mix two parts of acetic ether with two parts of water, and they will separate. Add now one part of alcohol, and the two layers immediately unite, the

[7] We have in previous articles (*Proc. Am. Pharm. Assoc.*, 1879–1885) endeavored to make it plain that a precipitate, or better, *separate*, may be either a solid or a liquid, and either heavier or lighter than the bulk of the liquid.

three forming a transparent solution. Let us, with this thought, introduce Table II, formulated as follows:—

Begin with the last member (No. 14) of the list, liquid petrolatum, and add successively two parts of each that precedes, agitating after each addition. They will mix transparent until No. 9 is reached (sulphuric ether), when the solution becomes milky, and remains milky after No. 8 (acetic ether) is added, but it again becomes transparent upon the addition of No. 7 (amylic alcohol), remaining transparent therefrom to and including No. 3 (alcohol). It will be seen that an incompatible appears when we add No. 9 (sulphuric ether):—[8]

TABLE II.

Liquid Petrolatum,
Turpentine Oil (rectified),
Benzin,
Carbon Disulphide,
Benzol,
Sulphuric Ether (U. S. P. 1880) (clouds),
Acetic Ether (clouds),
Amylic Alcohol (clears),
Chloroform,
Acetone,
Methyl Alcohol,
Alcohol (U. S. P. 1880),
Water (separates into two sections).

Precipitation or cloudiness may be avoided by merely altering the order of mixing, as follows (Table III), shaking with each addition:[9]

TABLE III.

2 Cc. Liquid Petrolatum,
2 Cc. Turpentine,
2 Cc. Benzin,
2 Cc. Carbon Disulphide,
2 Cc. Benzol,
2 Cc. Amylic Alcohol,
2 Cc. Chloroform,
2 Cc. Acetone,
2 Cc. Methyl Alcohol,
2 Cc. Sulphuric Ether,
2 Cc. Acetic Ether,
2 Cc. Alcohol.

In this case the mixture remains transparent from the beginning to the end. Let us now consider

TABLE IV. (Not necessary to name in detail.)

[8] This is not due to the *ether*, but to the water it contains. This phase of the subject presents a fruitful opportunity that can not now be considered. If pure sulphuric ether be used (U. S. P. 1910) the liquid is clear, to the acetic ether. I infer that acetic ether water free will not cloud (Later Note, 1917). So pronounced is this influence that, if (Table No. III) Sulphuric Ether U. S. P. 1910 be used instead of that of 1880, the meniscus, on the addition of the water, is (1910) about 5, instead of (1880) which is 9.

[9] In these experiments, owing to the convenience of measuring two (2) cubic centimeters in the cylinder employed (see Fig. 3, p. 948; also Figs. 8, 9 and 10) that amount is as a rule taken as the unit. Hence 2 parts, refers to 2 Cc. Any desired unit may be employed.

Begin with methyl alcohol, pass successively (Table I) to (and including) liquid petrolatum, then reverse and add to this mixture the chloroform, passing successively to (not including) water. The liquid is transparent from first to last.

Consider now the natures of these several ingredients (see qualities of the members of Table I). We find that (Table III) we have assimilated a mass of incongruities into a common whole, by dispersing (preventing surface films forming) each mixture as the respective liquid is added. Of the list, only two—chloroform and amylic alcohol—will mix in equal amounts with every member. The others exhibit varying solvent properties, each excluding wholly or in part, when taken separately, nearly half the members included in the list, many being practically insoluble in each other. And yet, the product above-named becomes, at the start, a menstruum of perfect transparency, and remains so to the end.

Breaking the Combination. Add now to this transparent menstruum (Table III) two parts of water; immediate precipitation results, the upper liquid occupying *nine* (about) parts. (Fig. 6.) Add now two parts of glycerin,—the mixture practically *reverses* itself, the lower layer being about *five* parts (Fig. 7).[10] The original mixture

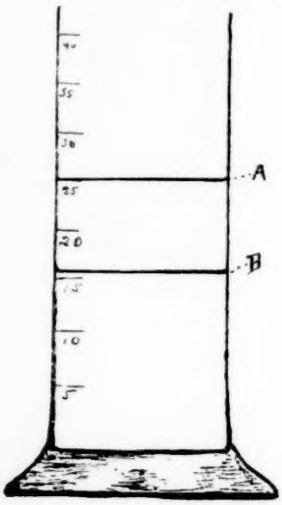

FIG. 6.
A—Air surface.
B—Meniscus between liquids.

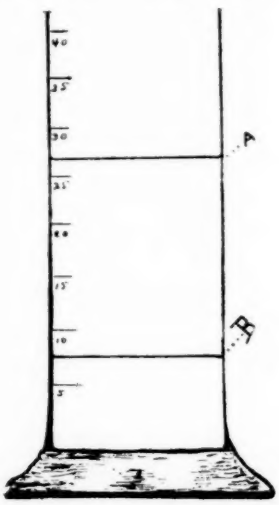

FIG. 7.
A—Air surface.
B—Meniscus between liquids.

is not a solvent for either of these liquids, but each possesses selective affinities for certain members of the group, resulting in the aforenamed remarkable movement of the line of division. Indeed, when we consider the fact that neither glycerin nor water will mix with any member of the third class and that but one member of the third class will mix freely with any member of the first class, and that the members of the second class will in no case mix with all the members of the first and third classes, it is apparently illogical to expect that we could make a mixture

[10] In repeating these experiments, slight deviations in the final line of separation are likely to occur, even to the extent of one division. This is due, not alone to temperature, but to the "shaking" process of admixture. This (shaking action) has been with me subject for a special study, which can not here be intruded. Physical action seems an important factor. Most perplexing discordant results have, in some instances, not as yet been accounted for.

of liquids from the foregoing list that would dissolve liquid petrolatum, glycerin, and water, even in any appreciable amount.

We have to this point considered separates[11] of two layers only.

Three Separates. It is impossible, so far as our experimentation extends, to make a mixture of equal amounts of either the first and second classes, or of the second and third classes, that will separate from each other in three layers. It is possible, however, to select from the central class, and the two extremities, liquids that refuse to unite, forming three layers. Thus a mixture of

2 Cc. Glycerin,
2 Cc. Acetone,
2 Cc. Liquid Petrolatum,

on being shaken together, will separate into three layers, each approximating the amount of the respective original liquid. (Fig. 8.) This equilibrium may be broken by the addition of any solvent that exhibits an attraction for two of the members, in which case one surface film disappears and two layers result. Thus the addition of two parts of water to the aforenamed ingredients will combine the glycerin and acetone (two layers resulting), both (glycerin and acetone) being miscible with water, the liquid petrolatum being excluded, as it is indifferent to all of them. (Fig. 9.) We are again led to the supposition that it must be impossible to unite such opposites (as glycerin and liquid petrolatum) in a single menstruum. To do so, it would appear necessary to construct a solvent (restricted to liquids) such as Paracelsus mentioned and Von Helmont dilated on, under the name Alkahest, or Universal Solvent.

Neutral Solvent Precipitates. It is well known that a solvent capable of holding a solid substance in solution need not necessarily be capable of totally redissolving it after it has been precipitated. It is much easier to produce precipitates than it is to redissolve them in the same solvent. This, too, even though no change to crystalline condition has resulted. Liquid substances, when insoluble in a menstruum, differ from solid precipitates only in being liquid separates. With them, the rule governing resolution of solids holds good. A precipitated liquid in fine division may be very quickly dissolved in an appropriate menstruum, but, if agglutinated into material drops, or resting in layers, it may dissolve very slowly. Hence it is that the order in which liquids are mixed may become of importance in pharmaceutical manipulation.[12] If a selection of the liquids herein considered be mixed in a certain order so as to avoid drop (agglutinated) separations, the liquid may be transparent from first to last, the ultimate result being a clear liquid having the power of dissolving further amounts of each of its constituents.

If, upon the other hand, the same liquids and the same proportions be maintained, but a different order of admixture employed, the mixture may be continually precipitating (paralleling rain in the air), the final result being a liquid precipitate that refuses to redissolve. This fact is illustrated by first making a mixture, as follows (Table V), shaking after each addition:—

[11] This term is employed to designate the separated layers of liquids. In the study of the "meniscus" as yet unpublished, it is constantly used. See as examples Figs. 4 and 5. Also the different appearances of the meniscus separating the liquids in the other illustrations.

[12] Sometimes, as in making emulsions, the reverse of solution is desired In these it is desirous that the surface films be not easily broken.

TABLE V.

2 Cc. Liquid Petrolatum,
2 Cc. Turpentine,
2 Cc. Benzin,
2 Cc. Carbon Disulphide,
2 Cc. Benzol,
2 Cc. Amylic Alcohol,
2 Cc. Acetone,
2 Cc. Methyl Alcohol,
2 Cc. Sulphuric Ether,
2 Cc. Acetic Ether,
2 Cc. Glycerin,
2 Cc. Alcohol,
2 Cc. Water.

This mixture is *clear* until the water is added (see also Table IV).

Repeat now the experiment, mixing the same liquids in the following order:—

TABLE VI.

2 Cc. Water,
2 Cc. Liquid Petrolatum,
2 Cc. Glycerin,
2 Cc. Turpentine,
2 Cc. Benzin,
2 Cc. Carbon Disulphide,
2 Cc. Benzol,
2 Cc. Amylic Alcohol,
2 Cc. Acetone,
2 Cc. Methyl Alcohol,
2 Cc. Alcohol,
2 Cc. Sulphuric Ether,
2 Cc. Acetic Ether.

The result will be a mixture that is continuously sectional or emulsified,[13] and yet, excepting the order of arrangement, the liquids are from the beginning in exactly the same proportions employed in the previous experiment. At no point is the mixture possessed of the same solvent power or the same pharmaceutical opportunities as at any other point. And, at no point does one mixture (Table V) parallel the other (Table VI). The study of such phenomena as this is complicated indeed. Pharmaceutical *art* (Plant Pharmacy) depends in its outreaches largely on the application of processes established by the investigation of such problems as these.

Breaking the Surface Film. A Cosmopolitan Solvent.

From a consideration of the *principles* involved in the foregoing line of experiments, regarding surface films and contact curves,[14] it would seem that it might be possible to make a selection of members of the foregoing series in such a manner as to prevent the formation of the surface films, leaving finally several free bonds of attractive associates, thus making a

[13] Each mixture is an emulsion which, if allowed to stand, would separate into sections. The study of emulsions is most important and scientific. Research must yet be applied to this phenomenon. My further researches in contact films, capillarity, mass action and connected phenomena, as yet unpublished, show that pharmacy has herein a great scientific opportunity.

[14] Continuous mention is being made of division lines (surface films and meniscus) between liquids, but no direct attention has been called to them. They, however, have been the subject of my some years' empirical study.

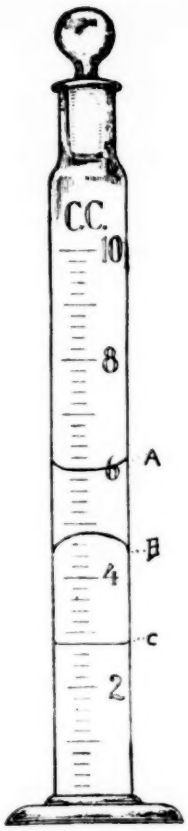

FIG. 8.

A—Air surface.
B—Upper liquid meniscus.
C—Lower liquid meniscus.

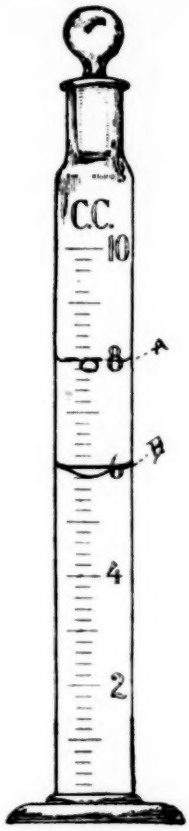

FIG. 9.

A—Air surface.
B—Liquid meniscus. (Note pendant drops).

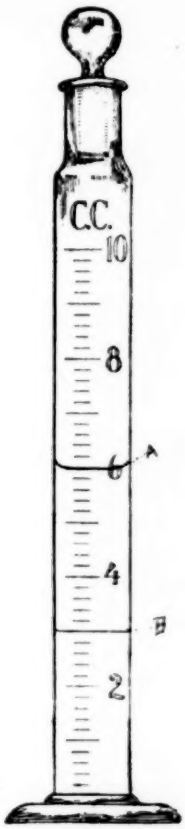

FIG. 10.

A—Air surface.
B—Meniscus between liquids.

solvent that will be capable of breaking other contact films and consequently of dissolving, more or less, liquids that are opposite in character.[15] On the other hand, it might seem that if a mixture be so constituted as to possess an affinity for either extreme, it must be passive to, or repulse the opposite. Thus, if it be composed of a mixture of solvents out of Classes 2 and 3, that, when combined, have free bonds of attraction for, and possess the power of dissolving liquid petrolatum, it would seem natural to expect it to refuse to dissolve water or glycerin. The reverse is also probable, for it appears irrational to expect that a liquid compounded of Classes 1 and 2 can dissolve liquid petrolatum, which separates from each member of these classes. Carrying this thought further, it seems that if it is possible to devise a mixture capable of dissolving the three incongruities, liquid petrolatum, water and glycerin, it will also dissolve more or less of all fats and oils, as well as other substances soluble in any intermediate liquid of this list.

[15] This writer has observed that liquids capable of completely dissolving each other produce no surface films when mixed in any and all proportions. The term "free bonds of attraction," introduced (coined) herewith, seems to apply in directions where an interlaced solvent is unsatisfied in any class direction. Hence, the expression, "free bonds of attractive associates."

In accordance with this line of reasoning the apparently impossible is to be sought, *e. g.*, a solvent capable of dissolving the extremes, glycerin and liquid petrolatum, neither of which dissolves the other, and neither of which vaporizes into the other. A mixture of the following liquids produces a menstruum of these exceptional qualities. At no time is a contact division (meniscus) possible in making this mixture,[16] regardless of the order of mixing (Table VII):—

TABLE VII.

2 Cc. Benzol,
10 Cc. Sulphuric Ether (U. S. P. 1880),
4 Cc. Acetic Ether,
2 Cc. Amylic Alcohol,
2 Cc. Chloroform,
10 Cc. Acetone,
10 Cc. Methyl Alcohol,
6 Cc. Alcohol (U. S. P. 1880).

Owing to variations in vaporizing points of these ingredients, exposure, even brief, materially alters the solvent reactions of this mixture.

In this menstruum all essential oils tested (those in commercial use and all others attainable), and all members, from 3 to 13 (inclusive) of the three classes of liquids named herein, dissolve in all proportions.[17]

If the mixture is made by adding the material to be dissolved in small portions at a time (drop by drop with liquid petrolatum), shaking after each addition, it will also dissolve:—[18]

$^2/_7$th its bulk of Water,
$^5/_7$th its bulk of Glycerin,
$^1/_{16}$ its bulk of Liquid Petrolatum.

Fixed oils, such as Olive Oil, Castor Oil, Linseed Oil, Cotton Seed Oil, Cod Liver Oil and others tested, dissolve freely,—Castor Oil in all proportions. It dissolves every alkaloid tested, even Morphine being very soluble.

Temperature. Possibly in no other manipulative direction is the influence of temperature more important than in the study of solvents and the meniscus of separation. Temperature, in the preceding investigations, was as near 70° F. as attainable, but there were deviations which should have been recorded.[19] Whether or not such reactions as these can be classed as altogether or in part chemical, is problematical. Nevertheless, "mass attractions" that coalesce seemingly unchanged liquid bodies, are most pronounced, and in these, *temperature* applies as directly as in true chemistry.[20] In other directions,

[16] If absolute alcohol and pure sulphuric ether (free from water) be used, the qualities as a solvent of extremes are enhanced.

[17] The original notes carry experiments with the ordinary fixed oils. These are omitted, not because they are of no value, but because they open up a series of problems that should be discussed if the record is printed.

[18] Statement of 1885 is approximately verified 1917.

[19] The temperature of 32° F. is finally accepted as most easily attainable, and the best standard.

[20] From one view, this word might better be replaced by *liquid*. From another, *liquid* does not fully answer. For example, solid camphor and thymol, triturated together, dissolve each other, a liquid resulting. In like manner, Di-cerberine sulphate triturated with thymol produces a liquid. In these cases solids act as solvents. Indeed, gases may do so. If under a bell glass, a piece of thymol is placed near a piece of camphor, each liquefies the other, by reason of their respective vapors, the thymol first becoming fluid.

as shown in studies of the meniscus between liquids (not yet published) even greater influences are observed than with oils.[21]

The Addition of a Solvent May Over-balance a Perfect Solution and Produce Separation.

It is found that the addition of one solvent to an association of solvents in perfect solution may produce precipitation of one or more of the constituents. Thus, if two parts of alcohol be mixed with two parts of chloroform, and to the clear solution two parts of water be added, separation ensues, the liquids producing two sections about equally divided. The chloroform holds part of the alcohol, and the water the rest of it. However, the hydro-alcoholic layer above the line holds some chloroform in solution and the chloroformic-alcoholic layer below the line holds some water, so that in the equilibrium that is established, all the liquids are partly represented in both sections. This is also exhibited in the separation shown in Tables V and VI, when the water is added to the clear liquid.

Process of Establishing Solubilities.

Where liquids have no solvent affinity whatever, for example liquid petrolatum versus either water or glycerin, a mixture of them in any possible proportion, separates, on standing, each in its full amount. But, if they mutually coalesce, even slightly, the only satisfactory method to determine their solubilities appears to be to add one liquid, drop by drop, to a given bulk of the other, shaking well after each addition, until finally, milkiness follows. To establish reverse solubility, reverse the liquids. This is, in our experiments, accepted as establishing the solvent point of each for the other, the decision being *not from the increase in bulk of the mixture*, but from the amount of the respective liquids added. Here, too, care must be employed to establish the temperature with exactness, if a record of proportions is made.

Change of Location of Line of Demarcation No. Criterion of Solubilities.

The change in position of the line of demarcation does not show the proportion dissolved where two liquids are shaken together, and allowed to separate. The division line then locates itself between the *balanced* new liquids. Although each has dissolved much of the other, the meniscus of separation may be on or near the original line.

Example. If 2 Cc. of alcohol, 2 of water and 2 of chloroform be mixed, the line of separation will be at $5^1/_2$, indicating that the chloroform has dissolved $2^1/_2$ parts, which would make it take $^1/_2$ part of water. (Fig. 10.) The fact is, however, that most of the water is in the upper layer. Again, take liquid petrolatum and the mixture of Table VII. The addition of liquid petrolatum, drop by drop, demonstrated the solution of $^1/_{16}$th its bulk. But if we mix equal amounts (5 Cc. each), on separation the liquid petrolatum *rises* $^3/_4$th Cc., which would indicate that it was not at all soluble in the liquid that had previously been shown to dissolve it.

Perhaps a more forcible exhibition of such a disturbance is shown in Table IV and "Breaking the Combination," where, in a transparent compound of 24 Cc.,

[21] The separation of dissolved solids may be very slow when the solution is cooled below their saturation point. Liquids separate almost instantly. Very slight temperature alterations produce immediate sectional disturbances. The temperature change between opalescence and transparency may be too slight to affect the ordinary thermometer.

the addition of 2 Cc. water produced nearly an equal division. Since the water is mainly in the upper layer, it apparently dissolved many times its bulk of the liquid. In reality, it became a disturber, breaking the equilibrium of the complex solution, taking its place as a part of the section with which it chiefly affiliated. Very difficult would it be to establish the exact amount of the integral constituents in either section.

Apply now the foregoing to the series of solvents considered in this paper, beginning with No. 14, liquid petrolatum. It is found that on mixing two parts of each, when the sulphuric ether and acetic ether are successively added, the mixture clouds (see Table V). Then, until the water (No. 2) is reached, the solution is transparent, but on addition of two parts of water, separation ensues, the lower layer consisting of *four* parts instead of two, as might possibly be expected (two parts of water having been used) if division lines were our guide. Continuing the addition of successive portions of water for a reasonable time, it is seen that there is a nearly uniform increase of the lower layer over the two parts of water added, as is shown by the following table:—

2 parts water produce about	4	parts.
4 parts water produce about	6 1/2	parts.
6 parts water produce about	9	parts.
8 parts water produce about	11 1/2	parts.
10 parts water produce about	14	parts.

Finally, if carried far enough, the addition of water results practically in the separation of only the proportion added.

In these examples, the equilibrium established after the water was added, resulted in the formation of two liquids that changed in constitution with each addition of the single substance, water. Simultaneously the solvent power of the sections altered, as is shown by the varying proportions (Movement of Meniscus) that result while the additions were being made. Finally, the members of the third class, especially liquid petrolatum, are nearly separated from the members of the first class, especially glycerin and water, while the intermediate members arrange themselves according to their affinities, in varying proportions in the two layers. After this, the addition of water can not decrease the upper layer, and upon the other hand liquid petrolatum in any amount can not dissociate the lower layer.

An Endless Series of Solvents Produced by Neutral Solvents Combined with Plant Constituents.

Whenever we abstract what is apparently a single substance from a plant, by means of water or alcohol, we form at the same time, as the solution progresses, a series of new solvents, having successive powers of abstracting other plant constituents. Thus are formed a continuously changing line of new liquids, that may be of as many different qualities as it is possible to vary the proportions of the original liquids (resulting from solution of solids), these becoming *new* solvents, in their subsequent action on the soluble plant materials.

Each solid substance that the menstruum dissolves, becomes in turn a part of a new liquid, which is then a thing in itself, and may itself dissolve another substance, insoluble in the original menstruum, thereby forming a menstruum quite different from either of the preceding, and which is capable of dissolving a third substance, a new liquid springing thus into existence with each successive change. No solid

body is present at any time after the solution has formed, and yet the *solution of a solid* produces each new solvent.[22] We have a mixture of liquids possessed of individual solvent qualities, as much so as though we had mixed various liquids such as ether and water. Finally, the last liquid formed may not be able to hold in solution a substance that, originally dissolved, constituted a part of the first liquid. This body may then in part be thrown out of solution, resuming the solid form as a precipitate. In so doing, it alters the attributes of the solvent and starts a chain of *backward* reactions and precipitations. Such a "*separate*"[24] may be either liquid or solid. It may rise to the surface, or it may subside. It may be visible (solid), or invisible (liquid). It may be mucilaginous or gelatinous, as transparent as the medium it rests in, but yet not a true liquid or a pronounced solid.[24] As this "backward" reaction follows, chains of alterations and precipitations result, so familiar to persons perplexed by ever-altering plant solutions. Bold must be the man who announces that he comprehends the interchanging rearrangements continuously taking place in a solution of associated plant constituents, seemingly stable and apparently quiescent.

Our three classes of menstrua, with their fourteen numbers (see Table I) thus afford *in themselves*, as various proportions are used, the possibility of an infinite line of combinations. The successive liquids, produced by means of varying abstractions of the constituents of a single plant, may also dovetail into chains of compound solutions in which lines of separation are lost as these substances coalesce, each into the others. In this field, no recorded experiences govern us. The explorer has not attempted even to systematize the various phases of the problem, as applied to the principal constituents of a single known drug, acted upon as a whole by any compound menstruum, indeed, by any simple liquid.

But before we attempt to suggest specific application of these possibilities to plant pharmacy, we need consider an as yet seemingly incidental, but yet all-important and striking feature of this series of experiments, *viz., the plane of separation* (meniscus) between the separated classes of solvents. This study (meniscus) dovetails into and introduces *Capillarity*, one of the most vital influences in the practical application of pharmacy to plant preparations, but as yet totally neglected.

Addenda, 1917—In various directions, necessarily unmentioned, this writer has (since 1885) applied most pleasurable research, the results having been recorded in fragmentary manuscript form during the passing years. He hopes to be permitted to contribute to our Society next year a continuance of these old-time investigations, the same being localized on phenomena connected with capillarity,—the meniscus, surface films, what he denominates as the pendant drop (see the upper A, Fig. 4, and pendent drops A-B, Fig. 9), and "mass action" (term used originally) and physical influences connected with pharmaceutical problems. Let us then pass to the *Meniscus*.

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[22] This phenomenon is not restricted to plants, or plant products. See "Precipitates in Fluid Extracts," *Am. Pharm. Assn. Proceedings*, 1879–1885.

[23] This term may be considered very expressive of this reaction.

[24] In my opinion opportunities will be afforded researchers of the future to *see* the at present *invisible*. I can not but believe, for example, that there are zones, or emulsion surfaces, now *invisible*, but which yet will be *seen* by methods now unknown. This conclusion is furthered by the study of oils. Consider, as an example, the practically invisible globulus of tapioca in some forms of soup, enveloped in oil, water and mucilage.

MAGNESIUM SULPHATE.*

BY JACOB DINER.

Common salt has been used as a purgative by the ancients and it is reported that Paracelsus and his followers employed the tartrates of potassium for similar purposes. But the attention of physicians was drawn to this class of cathartics by Glauber in 1658 through his discovery of the *Sal Mirabile* commonly known as sodium sulphate.

In 1663 the Duke of Holstein paid 500 thalers for the secret of the preparation of the long famous *Sal Polychrestus* or *Tartarum vitriolatum*, probably a mixture of the neutral and the acid sulphates of potassium.

Seignette, an apothecary of Rochelle, prepared the sodium and potassium tartrate in 1672. Three years later, 1675, Grew first observed the presence of a purgative salt in the springs of Epsom and this salt was afterwards identified as magnesium sulphate by Dr. Black.[1]

The action of these salts was but indifferently understood for some time. The discovery of the phenomenon of osmosis[2] gave the first scientific explanation of the action of saline cathartics.[3] Liebig[4] simultaneously came to the same conclusion with Poisseuille, but did not publish his observations until some years later. However, the theory of Poisseuille and Liebig and many of their adherents that the endosmotic power of the saline alone determined its purgative action was disproven by the experiments of Aubert[5] who compared three of the most important saline cathartics and found that sodium phosphate possessed an endosmotic power of over twice that of sodium sulphate, and this in turn had an endosmotic equivalent of nearly three times that of magnesium sulphate. Accordingly one would suppose that sodium phosphate would be the strongest saline cathartic and magnesium sulphate the weakest, while the very opposite is the case.

In 1854 Colin[6] and later on Moreau[7] performed the now classical experiment of injecting saline solution into an isolated loop of intestines and demonstrated the increase in volume of the aqueous contents. Still the nature and origin of this increase was not clear.

RELATIONS OF THE SALTS TO PERISTALSIS OF GASTRO-INTESTINAL CANAL.

McCallum[8] felt justified, after a series of animal experiments, to draw the conclusion that all those salts which act as purgatives when introduced into the stomach or intestine, have the same action when injected subcutaneously or intravenously.

Meltzer and Auer[9] proved that subcutaneous and intravenous injections of magnesium salts produce neither purgation nor intestinal peristalsis. The moderate peristalsis produced by exposing the intestines to air, by destroying the dorsal cord or by intravenous or subcutaneous injections of certain saline purgatives and the powerful peristaltic constrictions produced in all parts of the gastro-intestinal canal by intravenous injections of ergot, eserine, or barium chloride can be completely inhibited by an intravenous injection of magnesium sulphate or chloride in doses insufficient to embarrass the respiration to any serious degree.

The *post mortem* peristalsis of animals which received intravenous injections of magnesium sulphate is considerably less in evidence than that of normal animals.

* Read before Scientific Section, A. Ph. A., Indianapolis meeting, 1917.

Auer[10] demonstrated in a series of experiments in which magnesium sulphate was injected into the jugular vein, in concentrations ranging from 1.7 to 25 percent, in amounts between 1 mil and 80 mils, that most of the rabbits showed no signs of purgation; the faeces passed during observation (2 to 4 hours) were dry and small in amounts.

Hay[11] summarizes his results as follows:

A saline purgative always excites more or less secretion from the alimentary canal, depending on the amount of the salt and the strength of its solution, and varying with the nature of the salt.

The excito-secretory action of the salt is probably due to the bitterness as well as to the irritant and specific properties of the salt and not to osmosis.

The low diffusibility of the salt impedes the absorption of the secreted fluid.

Between stimulated secretion on the one hand and impeded absorption on the other there is an accumulation of fluid in the canal.

The accumulated fluid, partly from ordinary dynamical laws, partly from gentle stimulation of the peristaltic movements excited by distension, reaches the rectum and produces purgation.

Purgation will not ensue if water be withheld from the diet for one or two days previous to the administration of the salt in concentrated form.

The absence of purgation is not due to the want of water in the alimentary canal but to its deficiency in the blood.

Under ordinary conditions, with an unrestricted supply of water, the maximal amount of fluid accumulated within the canal corresponds very nearly to the quantity of water required to form a 5 or 6 percent solution of the amount of salt administered.

If, therefore, a solution of this strength be given it does not increase in bulk.

If a solution of greater strength be administered it rapidly increases in volume until the maximum is attained. This it accomplishes in the case of a 20 percent solution in from one to one and a half hours.

After the maximum has been reached it begins gradually and slowly to diminish in quantity.

Caeteris paribus, the weaker or, in other words, the more voluminous the solution of the salt administered is, the more quickly is the maximum within the canal reached, and accordingly purgation follows with greater rapidity.

Unless the solution of the salt is more concentrated than 10 percent it excites little or no secretion in the stomach.

The salt is absorbed with extreme slowness by the stomach of the cat.

The salt excites an active secretion in the intestines, and probably for the most part in the small intestines, all portions of this viscus being capable of yielding the secretion in almost equal quantities.

The salt does not purge when injected into the blood and excites no intestinal peristalsis.

The magnesium sulphate is powerfully toxic when injected into the circulation, paralyzing first the respiration and afterward the heart and abolishing sensation or paralyzing the sensory-motor reflex centers.

According as the salt solution within the intestine increases in amount there occurs a corresponding diminution of the fluid in the blood.

The blood recoups itself in a short time by absorbing from the tissues a nearly equal quantity of their fluids.

The salt, after some hours, causes diuresis, and with it a second concentration of the blood which continues so long as diuresis is active.

Leubuscher[12] takes up the theory advanced by Liebig and Poisseuille that the action of the salt is purely due to endosmosis, that of Auber with reference to cathartic action when introduced parenterally and Hay's and Voit's, Bauer's, Moreau's, Lauder Brunton's etc., all with reference to influence of the salts on peristalsis. The results of his experiments seem to show that:

The increase in peristalsis plays only a minor part in the cathartic action of the salt.

No matter how the salts are introduced into the intestines there is always a secretion of fluid into the canal, and this is to be considered the main cause of the cathartic action.

There is no evidence that the salt inhibits resorption.

When introduced into circulation in sufficient amounts these salt have a constipating effect.

The investigations of Meltzer[13] on the nature of the action of magnesium as a cathartic suggest that magnesium sulphate when introduced by way of the mouth combines with the sodium chloride found in the stomach and with the alkalies and carbon dioxide of the circulation, and splits up into sodium sulphate and magnesium carbonate. The sodium sulphate is absorbed into the circulation and causes intestinal peristalsis. The magnesium carbonate acts possibly within the intestines in two ways: It attracts liquid within the lumen of the intestines thus distending it and probably acts directly on the mucosa as a chemical stimulus. It is possible that magnesium sulphate, either as such, or in new formed combination, may have simultaneous actions of exciting and inhibitory nature on the functions of the animal body and thus bring about tonus, rhythm and peristalsis of the intestine with resultant evacuation.

NERVES AND ANAESTHESIA.

Meltzer and Auer[14] have shown that solutions of magnesium salts, even in strong concentrations, when applied directly to the nerve trunks of animals, never seemed to produce irritation. By applications of solutions of magnesium salts to nerve trunks the conductivity can be interrupted and a more or less complete block for afferent and efferent, or normal or artificial impulses, can be established. This can be accomplished by hypertonic, isotonic and hypotonic solutions. The more concentrated the solution the sooner the effect is established.

In general it takes more time for the magnesium solutions to cause a nerve block than for other known local or general anaesthetics. The block produced in the nerves by magnesium solutions disappears sometime after removal of the solutions; the recovery of the nerve is greatly assisted by washing with Ringer's solution.

The solutions of magnesium salts affect the cardiac fibers more readily than the efferent fibers for the oesophagus and the afferent respiratory and vasoconstrictor fibers within the vagus; also the sensory fibers within the sciatic nerve are more readily affected than the motor nerve fibers. It is believed that the difference is not due to a selective action of the magnesium solutions upon the different nerve fibers but to a difference in the irritability of the nerve endings of these nerve fibers.

In 1899 Meltzer[15] demonstrated, on a rabbit, that the effect of an intracerebral injection of potassium chlorate was that of producing a long series of convulsions, forced movements, opisthotonus, etc., and in another rabbit the opposite effect by intracerebral injection of magnesium sulphate. Without preceding convulsions the rabbit became paralyzed in a short time. No explanation of this phenomenon was made at that time. In subsequent experiments made by Meltzer and Auer[16] it was determined that:

A certain dose of magnesium sulphate will produce a deep, often long-lasting anaesthesia with complete relaxation of all the voluntary muscles and aboli-

tion of some of the less important reflex activities, which anaesthesia terminates in complete recovery.

That a large dose of magnesium salts will produce a profound anaesthesia and general paralysis which sooner or later leads to a calm death without being preceded or accompanied by any symptoms of excitation . . . . . and not a single instance was observed in which that salt produced an increase of excitation; on the contrary any effect which this salt produced was invariably in the direction of a reduction of excitation or of its complete temporary or permanent abolition.

Haubald and Meltzer[17] were the first to report the production of spinal anaesthesia by magnesium sulphate.

Emil Stransky[18] has established the fact that subcutaneous injections of magnesium sulphate which produce narcosis cause an increase of the magnesium salts in the blood plasma; in the other organs there is either no increase at all or but very slight increase in the magnesium contents.

The relation of calcium contents to magnesium contents in the serum, which normally is strongly on the calcium side, is considerably altered in favor of magnesium so that the magnesium contents exceed even after awakening. It appears that the condition of narcosis is determined by a definite maximal value of the Ca/Mg quotient.

TETANUS.

Meltzer and Auer[19] show that: Intraspinal injections of magnesium sulphate, in doses which do not affect the respiratory center or other vital function, are capable of abolishing completely all clonic convulsions and tonic contractions in cases of human tetanus, and experimental tetanus in monkeys. The relating effects of the injections may last 24 hours or longer. In experimental tetanus in monkeys early intraspinal injections of magnesium sulphate are capable of retarding the progress and development of the tetanic symptoms.

The usual amount used in humans is 1 Cc. of a 25 percent solution for every 20 pounds of body weight.

A number of cases of successful treatment of tetanus by means of magnesium sulphate administered intraspinously are to be found in the medical literature [20–28].

On the other hand there are a number of cases, similarly treated, with fatal termination[29–32]:

Rozenowsky[33] reports from observations made during the present war that whenever the antitoxin treatment was associated with magnesium sulphate injections, either intralumbar or subcutaneous, the most favorable results were obtained. Furthermore he asserts that no unfavorable results or dangers from the use of magnesium sulphate were observed by them.

Robertson[34] gives a summary of some results obtained by the different methods of administering magnesium sulphate in tetanus.

Intraspinal Method: (4–5 Cc. of 25 percent solution) 81 patients, severe cases, with incubation period of less than five days, 36 died, 45 recovered, mortality 44.4 percent.

Anders and Morgan: 216 cases.

38 cases incubation period	5 days or less,	no	antitoxin—mortality 95%
23 cases incubation period	5 days or less,	plus	antitoxin—mortality 74%
58 cases incubation period	6–10 days or less,	no	antitoxin—mortality 79%
56 cases incubation period	6–10 days or less,	plus	antitoxin—mortality 71%
18 cases incubation period	over 10 days	no	antitoxin—mortality 93%
23 cases incubation period	over 10 days	plus	antitoxin—mortality 35%

Robertson concludes that . . . . . the administration of magnesium sulphate by intralumbar injection has brought about a definitely certain, even if small, decrease in the percentage of deaths from tetanus, as well as causing an undoubted diminution in the agony and suffering etc., etc.

Subcutaneous Method: (0.57 Mg. per kilo). Twelve cases, incubation period 6–10 days, mortality 8.3 as compared with 48.6 percent for the same group treated by intralumbar method. In addition to this 15 cases with incubation period of 10 days and over all recovered, reducing the mortality rate quoted above to 3.7 percent.

Intravenous Method: (3 percent solution). No conclusive data. Dangers: Overdose rapidly injected into vein; instant death; heart stops before respiration; such accidents rarely happen with subcutaneous injections. The sudden untoward action of the magnesium salts can be overcome by injections of calcium chloride,[35] or by physostigmine.[36]

We may conclude our remarks on magnesium sulphate and tetanus with a reference to Meltzer,[37] who points out that the fatal issue in tetanus is principally due to the spasms which profoundly affect the functions of respiration and circulation. He synopsizes briefly the four ways of magnesium sulphate medication in tetanus as follows:

1. *Subcutaneous injections.*—Dose not to exceed 2 Cc. nor less than 1.22 of the 25 percent solution per Kg. body weight. To be injected four times in 24 hours. No massage. Light etherization or morphinization should precede the injection of magnesium sulphate.

Administered in this way magnesium sulphate exerts its effect very slowly and principally by cumulative action. Will not relieve immediately severe and dangerous spasms.

2. *Intramuscular injections and inhalation of ether.*—The patient should be fairly well etherized and 2 Cc. of a 25 percent solution magnesium sulphate per Kg. body weight be injected into the muscles of the thigh. At the end of the injection massage the thigh and continue light ether anaesthesia for about 20 minutes longer. This method may greatly relieve even severe spasms, in less than half an hour, but the beneficial effect is liable to pass off completely after two or three hours. There may be local reaction and for this reason the injections should not be repeated too often nor should this method be used as a routine treatment.

3. *Intravenous injections.*—The concentration of the solution should be about 3 percent (isotonic) and not more than 5 Cc. per minute should be permitted to run into the vein. This mode of administration is capable of relieving dangerous effects of the spasms (tetanus of the diaphragm, constriction of the larynx) more promptly than any other method of application. But the beneficial effect may completely disappear in less than 30 minutes and furthermore the circulation may become affected by direct action on the myocardium. This method should therefore be reserved for emergency cases only.

4. *Intraspinal Injection.*—The dose to be injected, at the usual place in the lumbar region, should be 1 Cc. of a 25 percent solution for every 10 Kg. of body weight. The results of this method of treatment may become evident in less than half an hour, and after one hour the relaxation may be complete. The extent as well as the duration of the relief afforded to the patient is greater when the magnesium solution is given by the intraspinal method than by any other method of administration. The relief may last between 12 and 30 hours.

SEPSIS.

Harrar[38] used a solution of 30 grains magnesium sulphate in 8 ounces of water, and sometimes a similar quantity of a 2 percent solution for intravenous injections in a number of cases of puerperal sepsis. In all of his cases blood culture and uterine culture were made, many proving positive, showing streptococci. The remarkable results obtained lead the author to the conclusions that:—In the quantities and

dilutions described it is absolutely harmless when administered intravenously to women suffering with puerperal infection. That it is of more value early in the course of infection and seems to be of no value in chronic cases of secondary thrombophlebitis or pyemia. That the action of the drug seems to be chiefly on the organisms circulating in the blood. That it shortens the course of bacterial toxemias; and that it has reduced the mortality in puerperal septicemia in their hospital, from 93 to 20 percent.

According to Huggins,[39] a number of cases suffering from puerperal infection were treated by *slow* intravenous injections of magnesium sulphate with remarkably favorable results.

Freese[40] reports the use of magnesium sulphate and glycerin in the treatment of infections. A number of cases of infections (external) yielded very promptly to "hot solution of glycerin and salt" but he does not state the proportions used.

ACTION OF MAGNESIUM SULPHATE ON HEART, ETC.

Mathews and Jackson[41] hold that the action of magnesium sulphate upon the heart is practically the same throughout the mammalian, avian, reptilian and amphibian classes. This action consists of a very marked depression, characterized by an immediate decrease in the amplitude of the heart beat and of simultaneous progressive slowing which soon leads to a complete standstill, from which the heart may be recovered by artificial stimulation. Adrenalin and squill can not be used to offset this depression.

MacNider and Mathews,[42] after a discussion of the various theories as to origin and maintenance of the heart beat, and based on their observation of the behavior of the heart in response to certain physical and chemical stimuli while under the influence of magnesium sulphate, conclude that magnesium sulphate depresses the nervous mechanism in the heart, both accelerator and inhibitory—the latter more than the former to such as extent that it will not transmit to the contractile tissue impulses of the same degree as are set in by the usual physiological stimulus, whatever that may be, but that it will transmit the stronger electrical stimulus or the normal motor impulse after the heart muscle has been rendered more irritable.

RESPIRATION.

Meltzer and Auer[43] proved that magnesium salts in intravenous injections are very toxic, even in small doses, and that repetition of the injections within a relatively short time increases the susceptibility of the animal to the toxic effect. The first effect is on the respiration, which becomes completely inhibited. The respiratory center is deprived of its responsiveness to asphyxiated blood, and the reflex effect of sensory stimuli is greatly reduced. Large doses of salt, injected with rapid speed, affect also the tonus of the vasomotor center, but this toxic effect is not, as a rule, extreme and wears off sooner than the effect on the respiratory center.

SALIVARY DIGESTION.

Patten and Stiles[44] have shown that even concentrated solutions of magnesium sulphate do not inhibit the action of ptyalin on carbohydrates. The most striking instances of accelerating effects (upon the action of ptyalin) were obtained with salts of magnesium, calcium and barium.

ANTAGONISTIC ACTION OF CALCIUM AND MAGNESIUM SULPHATE.

Meltzer and Auer[45] show that apparently the respiratory mechanism, which becomes affected by magnesium more readily than any other function, is also more easily protected against this influence by calcium. Intravenous infusion of various calcium salts is capable of completely reversing the pronounced inhibitory effects brought on by various magnesium salts. The respiratory paralysis, the lost lid reflex, the motor paralysis, the lost general reflexes, the general anaesthesia, the loss of consciousness, the depression of the cardio-inhibitory action of the vagus, the lowering of the blood pressure—all are reversed and completely restored in a very short time by the injection of a comparatively small quantity of calcium salt. This does not hold good, however, for conditions brought about by large doses of magnesium.

On the other hand strontium differs in its action from that of calcium with respect to the neutralization of the inhibitory effect of magnesium. While it (strontium) does cause a very slight improvement of the respiration it seems to aggravate and hasten the inhibitory symptoms due to magnesium, especially the paralysis.

Joseph[46] has demonstrated that eserine tremor can be abolished by magnesium sulphate and that magnesium has a certain value as antidote for eserine poisoning but not on eserine myosis.

Joseph and Meltzer[47] also gave a demonstration on rabbits before the American Physiological Society: One rabbit received an intramuscular injection of 1.2 Cc. magnesium sulphate per kilo body weight with fatal results. Another rabbit received a similar dose of magnesium sulphate with a simultaneous injection of barium chloride and this rabbit appeared to be in good, normal condition, while still another rabbit, receiving a dose of barium chloride similar to that given to rabbit No. 2, promptly succumbed. The authors draw these conclusions from their work: The fatal action of magnesium is due to paralysis of respiration and barium counteracts just this effect of magnesium. It differs from the antagonistic action of calcium inasmuch as calcium antagonizes all the effects of magnesium while barium picks out only the respiration, the animal remaining anaesthetized, and paralyzed. Furthermore the experiment also proves that magnesium antagonizes the fatal effect of barium.

PATHS OF EXCRETION.

Mendel and Benedict[48] show that when soluble magnesium compounds are introduced parenterally into animals the greater portion of the excess injected leaves the body by way of the kidneys in less than 48 hours, thus emphasizing the importance of the kidney in the elimination of magnesium salts. The intestinal path is of minor, if any, significance for magnesium introduced under these conditions. A considerable quantity of magnesium may be retained in the body for a period of two weeks. The parenteral introduction of magnesium sulphate in dogs and rabbits is never followed by purgation.

The increased excretion of magnesium by the kidneys is accompanied by a marked rise in the urinary output of calcium while the calcium output in the faeces is decreased at the same time.

Inasmuch as magnesium sulphate was much in use for various purposes, among these the administration, subcutaneously, to relieve tetany in children, Courtney

and Fales[49] undertook a series of experiments to ascertain the rate of elimination in order to avoid a possible toxic accumulation of the salt in the body. They come to the conclusion that magnesium is eliminated rapidly enough, chiefly by way of the urine, to nullify a possible danger of cumulative effect of magnesium.

Meltzer and Lucas[50] show that magnesium salts when introduced subcutaneously are eliminated to a great extent through the kidneys. In nephrectomized rabbits the susceptibility to the toxic effect of magnesium salts is increased by about 50 percent.

The profound anaesthesia which a toxic dose of magnesium produces in nephrectomized rabbits may be continuous for 24 hours or longer. The commulative effect of magnesium salts in nephrectomized rabbits is very striking. The effect of several subminimum doses is equal to the effect produced by the sum of these doses given in a single injection.

A dose which when given soon after nephrectomy is fatal, causes only a non-fatal anaesthesia when given 18 hours or later after nephrectomy. Probably at that period vicarious paths develop sufficient for the elimination of a fraction of the salts. It is probably for this reason that the profound anaesthesia produced by a proper dose of magnesium salts is partially recovered from in about 12 to 18 hours after nephrectomy.

BLOOD PRESSURE AND EDEMA.

Very little, if any, attention has been paid to the influence of magnesium sulphate on blood pressure.

I wish to report briefly on a few cases which have come under my personal observation.

Case 1—Woman 68 years of age. Paroxysmal tachycardia. B. P. 185 mm. Hg. Systolic; 110 diastolic. A daily dose of 4 Gm. magnesium sulphate in 25 percent dilution (16 Cc. oral administration) resulted in a reduction of the systolic pressure to 154, diastolic 104, with marked prolongation of tachycardial intervals.

Case 2—Man 70 years of age, marked dyspnoea, irregular arrhythmia, cardio-nephritic. Systolic 180, diastolic 100. After six months' treatment there has been a gradual drop in the systolic pressure to a final 146 with unchanged diastolic and marked improvement in breathing. It has remained in *status quo* for the past four months with only an occasional dose of magnesium sulphate.

Case 3—Woman 72 years of age. Edema of extremities, nephritic and diabetic. Mitral and aortic lesions. Systolic 240, diastolic 160. Has been under treatment for two and a half years. Daily dose of 4 Gm. magnesium sulphate. At present 165–110. Urine shows only an occasional trace of albumin. Glycosuria is intermittent, no edema.

Several other cases have shown similar results but those quoted are the most striking in the series. The action of the magnesium sulphate in these cases is two-fold: First, by its purgative action it prevents intestinal stasis and reduces the resulting auto-intoxication to a minimum; second, by adsorption of water from the blood and tissues it reduces the circulating volume and decreases the blood pressure and edema. It must be borne in mind that the magnesium sulphate should be administered in concentrated form and no water must be allowed within three hours after administration of the drug.

PALATABLE MIXTURES.

In conclusion I wish to mention a few ways in which magnesium sulphate may be administered in a palatable way. For the sake of simplicity I have presented these in the form of prescriptions:—

1. Magnesium Sulphate	30.00 Gm.
Aromatic Sulphuric Acid	8.00 mils
Water	60.00 mils
Glycerin to make	120.00 mils
Dose: One tablespoonful.	
2. Magnesium Sulphate	30.00 Gm.
Fresh Orange Juice	30.00 mils
Water	60.00 mils
Glycerin to make	120.00 mils
Dose: One teaspoonful.	
3. Magnesium Sulphate	30.00 Gm.
Tincture Cardamom Comp	10.00 mils
Citric Acid	1.00 Gm.
Water	60.00 mils
Glycerin to make	120.00 mils
Dose: One teaspoonful.	
4. Magnesium Sulphate	30.00 Gm.
Citric Acid	1.00 Gm.
Syrup Sarsaparilla Comp	60.00 mils
Water to make	120.00 mils
Dose: One teaspoonful.	

Carlton[51] suggests the following mode of prescribing magnesium sulphate:

Magnesium Sulphate	1000.00 Gm.
Fluidextract Cardamom Comp	30.00 mils
Vanillin	1.50 Gm.
Garantose	16.00 Gm.
Alcohol	16.00 mils
Glycerin	60.00 mils
Coffee (roasted and ground)	60.00 Gm.
Water to make	2000.00 mils

DIRECTIONS: Stir the ground coffee in 2000 mils of boiling water, let stand 10 to 20 minutes. While hot add the magnesium sulphate and stir until dissolved. Dissolve the vanillin in the alcohol, add the glycerin and fluidextract and mix with the magnesium sulphate solution; when cold add the garantose, filter and bring up to the volume by addition of water. Thirty mils contain 15 grammes of magnesium sulphate.

SUMMARY.

1.—Magnesium sulphate is one of the promptest acting saline laxatives of our present materia medica.

2.—The degree of dilution modifies the rapidity of action.

3.—The mode of its cathartic action is presumably due to a combination of absorption of fluid from the blood, stimulation of secretion by the intestinal mucosa and increasing tonus and stimulating peristalsis of the intestinal musculature.

4.—Subcutaneous and intravenous injections do not produce catharsis.

5.—It produces local and general anaesthesia, but is not free from danger by reason of its marked depression of the respiratory center.

6.—Its toxicity is in inverse proportion to the ability of the animal to eliminate it from the system.

7.—Elimination takes place chiefly by kidney.

8.—The toxic effects are antagonized by calcium, barium and strontium salts but each to a different extent.

9.—It has proven of value in septic conditions, both local and general.

10.—In the treatment of tetanus, particularly in association with antitoxin, it has robbed war of some of its terrors.

11.—In concentrated solution it reduces blood pressure and edema.

12.—A few methods for dispensing palatable magnesium sulphate for oral administration are suggested.

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SOY BEANS AND SOY BEAN OIL.*

BY E. V. HOWELL.

This bean is a native of southeastern Asia. It is at present the most important legume grown in Japan, China and Manchuria, where it is grown almost exclusively for human food. It has been cultivated from a remote period, each district having its own distinctive variety, some two hundred kinds in all. It was brought to Europe in comparatively recent times and there cultivated in botanic gardens for more than a hundred years without attracting any particular attention. The bean was introduced into England in 1790. Apparently the first mention of soy beans in American literature, was in the *New England Farmer*, October 23, 1829, in an article by Thomas Nuttall. He grew a variety with red flowers and chocolate-

* Scientific Section, A. Ph. A., Indianapolis meeting, 1917.

brown seed in the botanic garden at Cambridge, Mass. From his observations he wrote a brief account of it: "Its principal recommendation at present is only a luxury, affording the well-known brown sauce 'Soy,' which at this time is prepared only in China and Japan." Just two years later, November 23, 1831, an article appeared in the same journal regarding the culture of the plant at Milton, Mass., the seed having been obtained from Nuttall. Further mention of the plant appeared in a brief account under the name "Japan Pea," by A. Ernst, Cincinnati, Ohio.

In 1854, the Perry Expedition to Japan brought back two varieties of "soja beans," one with white seeds, the other with red seeds. They were distributed by the Commissioner of Patents in 1854, and from then on frequent references to the plant occur in agricultural literature under the names Japan pea, Japan bean, and Japanese fodder plant. The name soy or soja bean followed. Prof. Henry Trimble, in June 1896 and in November 1897, in the *American Journal of Pharmacy* published excellent papers on the soy bean.

It is not adapted to sections with a short growing season; however, from the large number of varieties to choose from, there is little difficulty in growing it over an extensive section of the United States, particularly in the South. Scarcely more than a dozen varieties have as yet been grown in large quantities.

IMPORTANCE.

I think the soy bean is the most important plant introduced into the South within a hundred years. This opinion is based on the range of the plant, the value as a soil improver, and the numerous uses of the seed and oil, together with the fact that the present cottonseed oil mills can produce the oil with practically no change in machinery and thus double their mill season. The beans can be stored, as they are practically immune to insects. Especial emphasis is placed on this statement in the present demand for food on account of the war. In Japan the bean forms one of the most important articles of food, by nature a meat, to go with the starch of rice. The Chinese make from the beans a cheese resembling our own cheese, while the Japanese make the well-known sauce for rice or fish, soy or suey sauce. It is one of the principal ingredients in "Tofu" (bean curd), natto (steamed beans), and white and brown miso, which is like our molasses brown bread.

The beans are eaten as a vegetable, or in soup, or picked green, boiled and served cold with soy sauce, and sometimes as a salad. A "vegetable milk" is also produced from the bean, and this milk is the basis for the manufacture of the different vegetable cheeses. This milk is used fresh, and also a condensed milk is made from it. All of these foods are in daily use in Japanese homes, and for the poorer classes form the principal protein diet.

A factory for the production of this milk has been recently established in America. This can be used in cooking, by bakers, confectioners, and chocolate manufacturers. I have before me the following food articles in which soy bean meal is the principal ingredient: Egg substitute No. 1, egg substitute No. 2, colored cocoanuts, coffee substitute, cocoa substitute, roasted malted nuts, coloring curry powder, cutlet powder, soy and navy beans with pork, the equal of any pork and beans.

The use of the soy meal for soups, for proportional use in muffins, cookies, fritters, croquettes, biscuit, and loaf bread is unlimited. Its use is checked only

by our prejudice for certain customary flavors, just as northern people and Europeans do not use corn meal. In other words, North Carolina, if forced to by war conditions, could largely exist on the soy beans crushed in the State this year, including the imported and native beans crushed, the oil from which I estimate to yield this year 400,000 gallons. This oil can be used for frying, and for a salad oil in French dressing or in mayonnaise. I fried a partridge in the crude unrefined oil, and found it delicious.

While the chief use, so far, of the oil has been for soaps and paints, the particular object of this paper has been to call attention to the use of soy oil in pharmaceutical preparations. In brief, these experiments show first the necessity of a distinctive test for soy oil. It does not respond to the Halphen test for cottonseed oil, nor the hydrochloric acid-sugar test for sesame oil. It was substituted for cottonseed oil in Camphor Liniment, for linseed oil in Compound Solution of Cresol, for olive oil in Compound Brown Plaster, N. F., and Brown Ointment, N. F., for sesame oil in Ammonia Liniment, with satisfactory results. In Phenolated Oil, N. F., the soy oil used for olive oil became darker after standing several weeks. A Manchurian oil purchased in New York gave these results:[1]

	Specific gravity.	Saponification value.	Iodine value.
Sample No. 1	0.9240	194.4	131.1
Sample No. 2	0.9244	194.9	130.9
Sample No. 3	0.9241	194.6	131.3

An ordinary pycnometer was used at 20° Centigrade. The iodine number represents the percentage of iodine monobromide, in terms of iodine, absorbed by the oil. From a sample of mammoth yellow beans we found ash 3.6 percent, oil 21 percent by ether solvent and Soxhlet extraction. No evidence of alkaloids was discovered.

CONSTITUENTS OF SOY BEANS.

The Government and certain state agricultural departments have so extensively treated this subject, in the bibliography cited in this paper, that merely typical analyses will be given.

SOY BEAN MEAL.

	Moisture.	Protein.	Fat.	Nitrogen-Free Extract.	Ash.	Fiber.
Soy bean	7.59	44.65	8.77	27.12	5.89	5.96
Cottonseed	6.62	40.29	7.41	28.63	6.21	10.84
Linseed, old process	8.98	33.23	7.20	36.51	5.40	8.68
Linseed, new process	9.63	37.51	2.49	36.09	5.54	8.74
Peanut, decorticated	10.73	46.84	7.91	24.34	4.89	5.29
Sunflower seed	7.68	23.80	7.94	27.49	5.03	28.06

The average oil content of soy beans is 19 percent. While some varieties will uniformly run a little higher, two lots of the same variety will vary from 18 to 21 percent, while occasionally a lot may run a little below 18 percent.

During the past six or seven months there has been produced in this country in the neighborhood of one hundred thousand gallons of soy oil. The largest part of this quantity has been produced in North Carolina by the Elizabeth City

[1] "Investigation of Soy Bean Oil," George W. Byrd, Chapel Hill, N. C.

Oil & Fertilizer Co., Winterville Cotton Oil Co., and the New Bern Cotton Oil & Fertilizer Mills. Samples from the different crushings have been examined in comparison with the imported oils. It was found that the chemical constants of the domestic oils compared very closely with those of the imported oils. A comparison of the chemical constants is here shown from a report of L. P. Nemzek, to Bureau of Paint Manufacturers:

Identification No.	Specific gravity.	Iodine number.	Acid number.	Saponification value.
FI, No. 9355 (Domestic)	0.929	124.3	0.8	194
Lab. No. 383 (Domestic)	0.921	129	0.6	193.8
Lab. No. 411 (Domestic)	0.924	126	1.3	201
Lab. No. 409 (Domestic)	0.925	123.5	2.0	196.1
Lab. No. 335 (Domestic)	0.924	126.3	1.2	190.4
Imported Oil, FI, No. 8940	0.925	123.8	1.9	190
Imported Oil, FI, No. 9029	0.925	133.8	3.1	190

THE UNITED STATES GOVERNMENT'S ESTIMATE OF THE VALUE OF THE SOY BEAN AS A FOOD FOR MANKIND.

In *Farmers Bulletin* No. 121, issued Nov. 19, 1906, prepared under the supervision of the Office of Experiment Stations, on pages 12 and 13, an account of soy beans is given, and the statement made that "In the Orient this bean, and the various food products made from it, are so largely consumed that it is, perhaps, the most important food plant next to rice."

On page 19 of this *Bulletin* we find a comparison of the food values of various food materials, in which we find these analyses:

Material.	Water. Percent.	Protein. Percent.	Fat. Percent.	Ash. Percent.	Carbohydrates. Percent.	Fuel value per pound calories.
Navy beans	12.6	22.5	1.8	3.5	59.6	1,605
Soy beans	10.8	34.0	16.8	4.7	33.7	1,970
Potatoes	78.3	2.2	0.1	1.0	18.4	385
Wheat flour	11.9	10.7	1.0	0.6	75.8	1,650
Lean beef	70.0	21.3	7.9	1.1	..	730
Milk	87.0	3.3	4.4	0.7	5.0	325
Eggs	73.7	14.8	10.5	1.0	..	720

MEDICINAL USE.

In England a diabetic biscuit is manufactured. In this country an infant's food from the soy bean is on the market. The enzyme in the bean is also attracting attention and opening a field for investigation. In conclusion, I want to call attention to the necessity of examining the imported seed for plant diseases as the cake is entering into commercial fertilizers and the danger from spreading the meal over land is obvious to those who know the cost of the imported boll-weevil, or the San José scale.

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AMERICAN SULPHUR.—HERMAN FRASCH.*

BY M. A. MANSBACH.

To start with, I am neither a scientist nor a chemist, and the excuse which I have for appearing before you consists mainly of the facts, first, that at the present time there is an extraordinary famine in sulphur; second, the revolution brought about in the winning of sulphur by that wonderful chemical and mechanical genius, Herman Frasch, is yet far too little known; and third, the Government states in the *United States Geological Survey Bulletin* No. 666B, that, as a preparedness measure, the sulphur deposits that are now idle should be thoroughly developed, search should be made for new deposits in areas where the geological conditions are similar to those in the vicinity of known deposits, and that other deposits of sulphite ores should be intensely developed.

Sulphuric acid, a government specialist has said, is probably used for a greater variety of purposes in the chemical arts than any other substance. It is made largely from sulphur. This acid and sulphur itself are employed in the manufacture of fertilizers, nitroglycerin, celluloid, powder, matches, fireworks, soap, paper, glass, starch, sugar, molasses, copper, galvanized iron, tin plate, artificial ice, effervescent drinks, shoe blacking, iron, steel, coke and medicine, for vulcanizing rubber, for bleaching wool and silk, for printing calico and tanning and for refining gold, silver and petroleum. It is surprising that no mention at all is made of the use of sulphur as a base for dyestuffs.

Previous to 1895 the method of producing sulphur consisted of digging for it in the same orthodox manner in which we are now digging for coal. This old method was found to be impracticable in this country owing to the great depth of the sulphur deposit, underlying a strata of oil-bearing quicksand. Losses of plants and hundreds of lives occurred until the Government intervened. Sicily at that time had quite a domineering position in the sulphur market. Sulphur is found in and near craters of volcanoes in Japan and Sicily. In Sicily, 35,000 men are employed in the winning of sulphur and this industry is of the greatest local importance. In 1833 sulphur was almost the cause of a war between England and Italy when an English fleet demonstrated in the Bay of Naples to compel Italy to rescind the sulphur monopoly granted to France. Sulphur is also found in Spain and Scandinavia, but not in sufficient quantities to compete with the Sicilian sulphur.

*An address before Scientific Section, A. Ph. A., Indianapolis meeting, 1917. The author was delayed and therefore it was impossible to illustrate the lecture; however pictures of the interior of the plant, sulphur deposits and pumps were shown; also samples of sulphur from the Louisiana, Texas and Nevada deposits.

In 1894–5, when another sulphur crisis threatened to break out in Sicily, the Anglo-Sicilian Company was formed. They controlled between 60 and 80 percent of the entire production and were thus able to pay a yearly dividend of 50 percent and to build up large resources for contingencies. This contingency arose very suddenly when it dawned upon the managers of the Anglo-Sicilian Company that it had to reckon with a new factor in the history of the sulphur production. That factor was Herman Frasch.

Now I might be pardoned to say a few words about this wonderful genius, who lived and was brought up in the same town as myself, who visited the same Latin school and gymnasium in the town of Halle. Soon after Herman Frasch came to America and entered the laboratory of Prof. Maisch at the Philadelphia College of Pharmacy. Industrial chemistry in the modern sense was at that time practically unknown and it was left to Herman Frasch's genius to work out the solution of many problems.

In 1874 he opened a laboratory on his own account and obtained his first patent in the same year on the method of using tin scrap profitably. When he was twenty-four years old, in the year 1876, he discovered the method of purifying paraffin wax. The patent was acquired by Mr. Rockefeller, and the candle and wax paper departments of the Standard Oil Company were the results. One of the most important inventions patented by Herman Frasch was one for the separation and treatment of oil. At that time Canadian oil was selling at $0.14 per barrel. It contained almost 1 percent of sulphur and had such an offensive odor that when a tanker laden with Canadian oil was lying in the port of New York, the food and butter stored in two adjacent steamers were entirely saturated with the same odor. Big lawsuits followed, and the production of oil in Canada had to be stopped.

Herman Frasch, in 1878, formed the Empire Oil Company, and at London, Ontario, solved the problem by a most wonderful chemical contrivance, introducing copper oxide that entirely absorbed the sulphur contained in the oil and made it as sweet and pure as the best Pennsylvania oil that sold at the time for $2.25 per barrel. Twenty additional patents were taken out in the years 1887 to 1894. In the meantime the Standard Oil Company had established large oil refineries in Ohio, going to very great expense. They treated the oil in the old orthodox way and the same was returned to them as utterly useless for lighting purposes. They had almost concluded a very large contract to build a pipe line to Chicago to sell oil for fuel purposes when Mr. Rockefeller heard of Frasch's desulphurizing process, which he bought after a thorough investigation. The Standard Oil Company bought the Empire Oil Company and Herman Frasch received shares of stock at 168, which was paying at the time 7 percent. When he had introduced his methods, he sold one-half of his holdings in the Standard Oil Company at 820. Ohio crude oil rose from $0.14 per barrel to $1.00 and above. The Standard Oil Company had made millions through this process and was able to raise the dividends from 7 to 40 percent and all the oil producers in Ohio, Illinois and Indiana were greatly benefited.

Among the many other very useful patents that Herman Frasch applied for, I will mention only one. In 1899, a patent was granted to him for an important process to bring to the surface by solution the rock salt reached by boring.

I mention this particularly because that same process has been used in my native town, Halle, Saxony, for hundreds and hundreds of years, and, in view of developments that took place one year later, I might be permitted to ask the question whether or not Frasch's early associations in the old "Salt City" of Halle were not responsible for the millions of dollars he was to make later? October 23, 1890, was the day which was to cause a revolution in the production of sulphur. Sulphur was discovered in Louisiana as long ago as 1865. Men boring for oil in Calcasieu Parish, La., found sulphur under a bed of quicksand several hundred feet thick. Repeated attempts were made to mine the sulphur, but without success. Engineers from France and Austria tried and failed. Herman Frasch heard of the deposit in 1891. He had already melted rock salt with water and had pumped it out of the ground into evaporating tanks. The same process, he thought, might be used in the Louisiana sulphur beds.

Having found and surveyed his golden treasure, Frasch began work on the problem of getting the sulphur out. A bed of quicksand 500 feet in thickness prevented the digging of a shaft. Besides, that method had been tried by others and all the casing had been lost. Moreover, Frasch was busy elsewhere. So several years passed, and then one day Frasch went to work in earnest. A well was driven, after nine months of labor, to the bottom of the deposit of sulphur. The well itself was a 10-inch pipe with perforations at the bottom. Inside that well were three pipes varying in size from one to six inches. In the meantime a battery of boilers had been located on the ground and special machinery invented by Frasch was attached to the boilers for the purpose of superheating great quantities of water.

Orders to fire the boilers were given one morning. When the water was heated to 335° F., Frasch turned it into the well. It ran out of the holes at the bottom of the 10-inch pipe, melting the sulphur, and twenty-four hours later, hot water still pouring in, the pump was started. The pump worked easily at first, but in a few minutes it "took hold" and presently a yellow stream came rushing out of the pipe. All the barrels were filled and then the sulphur was turned into a reservoir that had been hastily dug in the earth near by. The reservoir, too, was soon filled and the sulphur, hot but almost dry, was heaped up until it made a yellow hill. The day drawing to a close, Herman Frasch stopped the machinery and, climbing to the top of the hill, sat down in the sulphur and let it stream through the fingers of his open hand.

He bought the property and organized the company in 1894. It was not until 1903, however, that he obtained sulphur in paying quantities. He brought in 35,000 tons that year. In 1904, he had enough to supply the American market and to ship a cargo of 3,000 tons to France. In 1903, the imports of sulphur into the U. S. were 188,888 tons, the exports none. In 1907, the imports were 20,399 tons, the exports 35,000 tons. The production of sulphur in the U. S. during the year 1880 amounted to 536 tons and the price was $39.00 a ton. In 1904, the first big year of the Louisiana mine, the production was 128,000 tons; in 1911, 768,000 tons; in 1917, estimated requirements, 1,500,000 tons (600,000 tons short of production).

Government figures give the production of 1914 as having been 328,000 tons and practically all of it came from the southern swamp that Herman Frasch pur-

chased in 1894. At the beginning of his enterprise Frasch had introduced John D. Rockefeller's brother into his company, but, during the long years of hard and unsuccessful work and the beginning of the mine, Rockefeller lost heart and sold his interest out, thereby throwing away a yearly income of between $250,000 and $500,000. The real extent of Herman Frasch's wealth did not become known until after his death in Paris. His friends had always thought him a fairly wealthy man, but were amazed at the sensational figures of his millions which were disclosed afterward.

THE HISTOLOGY OF CASTELA NICHOLSONI.

BY C. J. ZUFALL.

Castela Nicholsoni is known in America as *Chaparra Amargosa* (Mexican for "bitter bush") and on the Island of Antigua as "Goatbush." This drug, although not widely known, is of considerable importance in the Southwest where it is employed in the treatment of amebic dysentery. One physician[1] states, "it is the most efficient remedy we have at the present for the treatment of this disease, unless we except emetine."

In 1883 J. L. Putegnat[2] made a brief study of the drug but did not describe the plant fully or give its histology. He determined the percent of extractives with various solvents and briefly studied the bitter amorphous principle, to which his father, J. L. Putegnat, had given the name "amargosin."

Hooker[3] first described the plant, a specimen of which was sent him by Dr. Nicholson of Antigua. Determining that it belonged to the family Simarubaceae and the genus *Castela*, but finding it not to conform to the descriptions of the known two species of *Castela*, he placed it as a new species and called it *Castela Nicholsoni* in honor of Dr. Nicholson.

The following is a translation of Hooker's description of *Castela Nicholsoni*:[3]

The main stem or trunk not exceeding four feet, much branched; branches provided with short axillary spines; small branches terete, silky-hoary. Leaves evergreen, alternate, sparse, in scattered groups, sessile, coriaceous, elliptical, mucronate, silky-gray beneath and margin revolute.

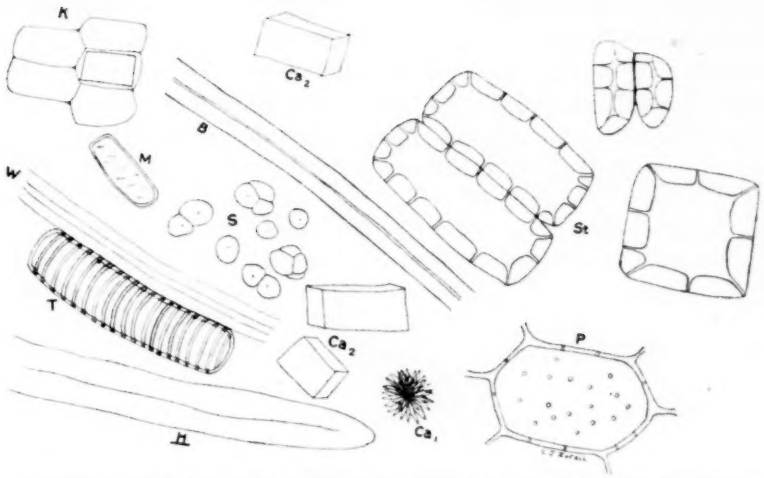
Flowers small, saffron- or orange-colored, dioecious. Peduncle axillary, short, one- or two-flowered.

Staminate flowers:—Calyx four-parted nearly to the base, segments ovate, variegated, persistent. Petals: four, ovate, spreading, deciduous. Stamens: eight, short, hairy, inserted on the fleshy receptacle. Anthers oblong, divided or sagitate and yellow.

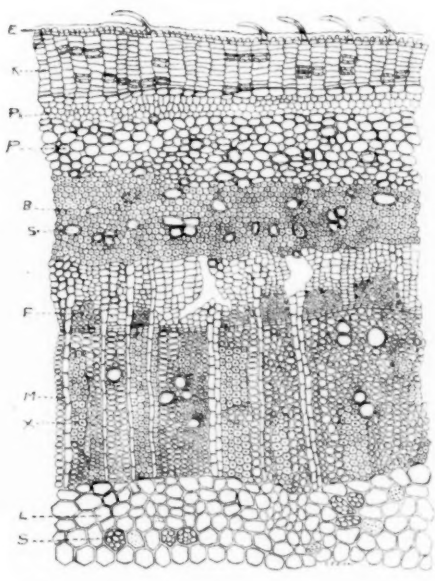
Pistillate flowers:—Calyx and corolla, same as in staminate flowers. Ovules: four, contiguous, one or two frequently abortive. Style short or none. Stigmas: four, small, and subulate. Stamens: eight, short, abortive, hirsute and adherent. Drupes: four, subglobose, base acuminate or short pedicelled, small, purple or red when mature. Nut compressed, ovate, bivalved, rugose, unilocular. Seeds suspended, sub-ovate, compressed. Albumen small, thin, flesh-colored. Embryo almost as large as the seed. Cotyledons straight, foliaceous.

Dr. Nicholson observes that "it is a beautiful little shrub, especially when in fruit. It is found growing in the utmost luxuriance in an arid calcareous soil where everything else is burnt up."[3]

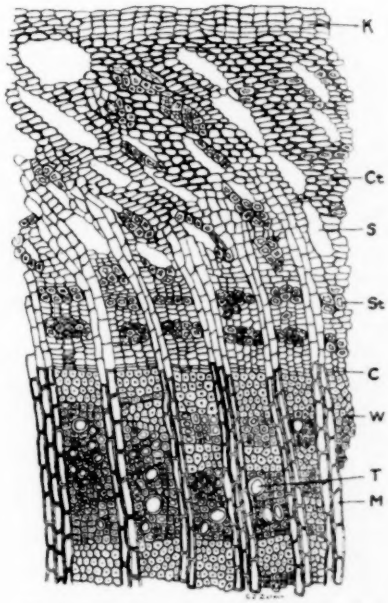
In America it is found in "southwest Texas and northern Mexico growing on thin, rocky, mesquite or post-oak land, and having an especial tendency to be found on small rocky hills."[1]



Elements found in powdered *Chaparro Amargosa:* St, stone cells; P, parenchyma cell of pith; Ca_1, calcium oxalate from leaf; Ca_2, calcium oxalate from root bark; S, starch grains; H, hair; T, trachea; W, wood fibre; M, medullary ray cell; K, cells from cortex, one containing a monoclinic crystal of calcium oxalate; B, bast.



Chaparro Amargosa. Transverse section of stem: E, epidermis; K, cork; Ph, phellogen; P, parenchyma; B, bast; St, stone cell; F, phloem; M, medullary ray; X, xylem; L, lignified parenchyma; S, starch.

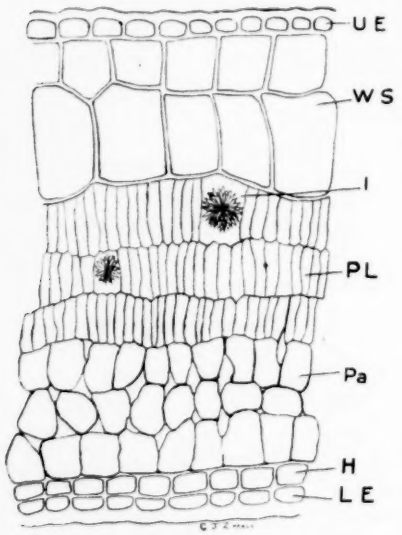


Chaparro Amargosa. Transverse section of root: K, cork cells; Ct, cortex; S, schizogenous cavities filled with a yellowish mucilage; St, stone cells; C, cambium; W, wood fibres; T, trachea; M, medullary ray.

It is also mentioned as being found on bluffs along the Rio Grande and its tributaries.[4]

The drug consists of the entire plant, all parts of which contain the bitter principle.[1] The stems reach a length of 12 dm. and a diameter of 15 mm. They are rough, of an ash-gray color and frequently covered with lichens, while the branches are covered with hairs and tipped with sharp points. It is very hard and the fracture is very tough and splintery. If cut smooth, the end shows a green bark about one mm. thick, the light-yellow wood has several rings of darker wood-fibres and the pith is about one-tenth the whole diameter.

The root is much larger than the stem, having a diameter of 20 to 45 mm. It is twisted and irregular in shape and covered with a rough, gray and cinnamon-brown bark which is furrowed and sometimes 6 mm. thick. In transverse section this bark shows a radiate structure, the rays being undulate which is characteristic and aids in distinguishing this from other hard and tough roots used in medicine. The wood is similar to that of the stem.



Chaparro Amargosa. Transverse section of leaf: U E, upper epidermis; W S, water-storage cells; I, idioblast containing a rosette aggregate of crystals of calcium oxalate; P L, palisade cells; Pa, parenchyma; H, hypodermal layer, L E, lower epidermis.

The dry drug has no odor but upon soaking in water an unpleasant nauseating odor develops.

Microscopically the transverse section of the stem is quite interesting and has a characteristic structure. The epidermal cells have very thick outer walls and some of the cells are modified to form non-glandular hairs in which the lumen is almost indistinguishable. There is a sub-epidermal layer of cork containing stone cells; then the phellogen, phelloderm and primary cortex followed by a thick layer of bast in which are many stone cells. Between this and the wood is the peculiar phloem. The xylem consists chiefly of wood fibres, tracheae being very few. The medullary rays are one to two cells wide and contain starch. The pith contains much starch and is made up of thick-walled polyhedral cells whose walls are lignified and marked with narrow slit-like pores.

The leaf is typical of the Xerophytes, being very small and well protected by a thick-walled epidermis and on the ventral surface by many hairs similar to those of the stem. Beneath the upper epidermis are two rows of large, thin-walled water-storage cells similar to the corresponding structure of the leaf of *Ficus elastica*. The palisade structure is made up of three or four layers of very narrow cells, among which are found idioblasts containing calcium oxalate in rosette aggregates. The parenchyma is compact, with small intercellular spaces, and next to the lower epidermis is a distinct layer of what may be called hypodermal cells.

Powder:—Starch grains abundant in pith and medullary rays; grains angular or spherical; four to nine microns in diameter, point of origin central, indistinct,

not cleft; lamellae indistinct. Medullary ray cells have thick walls marked with many simple pores. Calcium oxalate in large monoclinic and twin-form crystals; in root bark abundant. A few rosette aggregates from the leaf. Stone cells many, square, rectangular, irregular and with thick walls. Parenchyma cells of pith large, walls thick, lignified and marked with small circular pores. Tracheae few with spiral markings. Bast fibres abundant, long with very narrow lumen. Wood fibres abundant. Non-glandular hairs with very narrow lumen. Leaf fragments few.

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(4) Small, "Flora of the Southeastern United States."

THE SIMULATION OF DISEASE.

Reprint No. 433 from the *Public Health Reports* was issued November 9, 1917. This was prepared by A. G. DuMez, technical assistant in the Hygienic Laboratory, U. S. Public Health Service. In this paper some of the many methods employed for effecting simulation of disease by the use of drugs, chemicals and septic materials are given. The subject is of considerable interest at this time and its study is of some importance to pharmacists, in view of the fact that the services they may be called upon to render will include investigations of this kind. It is surprising to note the many means that are employed for inciting conditions that simulate diseases and the knowledge that must obtain with some of these methods. The substances enumerated in this paper are grouped under the diseases, the diagnostical signs of which their use is to simulate. Brief outlines of the methods recommended for the detection of these frauds are also included, where specific information of this kind has been available.

The divisions are: Substances used in simulation of diseases of the skin and subcutaneous tissue; of the eye; of the ear; of the throat; of the respiratory system; of the digestive system; of the circulatory system; of the kidneys; of metabolism and other diseased conditions. As an example for simulating eczema: After abrading the skin by scraping with a sharp-edged instrument or rubbing with some rough material, one or more of the following are applied: Croton oil, sulphur, acid substances, oil of cade, ointment of mercury, or mezereum bark. For detection, according to Blum (1916), the eruptions produced may be distinguished from those of the true disease by the fact that they are disseminated and do not form confluent masses. Furthermore, the skin, after the removal of the crust, does not appear red, dry, and hypertrophied, as in true eczema.

It is surprising to note the extent to which these men will go in applying injurious substances to bring about simulation of diseases. The results from some of these are doubtless apt to be permanent and remind them hereafter of their attempt at deception.

Quite a lengthy bibliography follows and reprints may be obtained from the usual source, namely, Superintendent of Documents, Government Printing Office, Washington, D. C.

SECTION ON EDUCATION AND LEGISLATION

PRACTICAL DRUG STORE EXPERIENCE BEFORE ENTERING COLLEGE.*

BY OTTO RAUBENHEIMER.

"All things must change
To something new,
To something strange!"
Longfellow--Keramos, L. 32.

Thirty years ago, when the writer entered a college of pharmacy, there was no prerequisite clause of one or more years of high school education. Nevertheless, the pharmacy students at that time were of a different type and of a better class than those of to-day. Many of my fellow students were graduates of high schools or similar institutions, and with pride do I look upon the members of the "Blizzard Class" and join their annual reunions. Thirty years ago in the good old times the student was not required to possess any "counts," *but he was compelled to have two years of practical drug store experience before entering a college of pharmacy!* The object of my paper is to point out the advantages of such professional training in a pharmacy before entering college, and I will divide them into four parts.

I. LOVE FOR PHARMACY.

How frequently, how very frequently, does it happen that a young man is advised to take up pharmacy, enters a college and after the short time of a year or so, takes up another profession or business. A pharmacist's bed is not one of roses and if it is, then they have plenty of thorns! The apprentice should first of all become familiar with the "ups and downs" in the life of a pharmacist. Only those who truly love pharmacy will stick to it. The apprenticeship is a true test for fitness, and these "survivors of the fittest" are the proper material for pharmacy students and for future pharmacists!

II. PRACTICAL TRAINING.

The apprentice who is employed in a drug store, in which pharmacy is practiced and prescriptions are compounded, is bound to obtain some practical knowledge. I know I did and thousands of others did the same. I do not refer particularly to the sweeping or mopping of the floor or the cleaning of mortars and graduates, although even such work and "knowing how to do it" is of benefit to the future pharmacist. In cleaning the shelf bottles the apprentice becomes familiar with the appearance of the drugs, chemicals and preparations, including their odor and even their taste, and besides this is learning the pharmaceutical nomenclature. He also becomes familiar with pharmaceutical apparatus and operations, a very important factor.

Right here I want to answer the criticism which will surely be made, namely: "In some stores the apprentice will receive no training and in others he will get a

* Read before Section on Education and Legislation, Atlantic City meeting, 1916.

wrong training." If there are any such so-called pharmacies then they should not be classed as such. Besides that, the apprentice will soon discover these things and will look for another, *real preceptor*.

III. COLLEGE EDUCATION.

"A little knowledge is a dangerous thing!" However it is better than none, especially in pharmacy.

Imagine a pharmacy student who has never seen a mortar or pestle, who has never heard of the U. S. P. or N. F., who does not know how to hold a graduate, and who has no idea of the approximate weight of a kilogramme or a grain. It is extremely difficult to teach such a student, even in the well-equipped pharmaceutical laboratories of our colleges! The time is too short at least in a two-year course, as at present.

A student with practical drug store experience has a very great advantage over his fellow-student, who lacks this, in being able to understand the lectures and to benefit by the quizzes and laboratory work.

IV. STATE BOARD EXAMINATION.

Most colleges of pharmacy admit the student at the age of seventeen and consequently graduate him when but 19 years old. This graduate is *supposed* to spend two more years in a pharmacy, which together with his two years of college training will give him a total experience of four years. By this time he will also attain the age of twenty-one, required by the State Board before taking the examination.

Theoretically, very good! However, practically no good! The graduate who follows this example and who works in one of the commercial drug stores of our age, will surely forget pretty much all he learned in college and will not pass the State Board examination, if same is strict, as it should be. This is one reason why we have so many Ph.G.'s who are not licensed pharmacists.

I can not help to state here that the required 4 years' experience is frequently faked by false affidavits, and it is therefore the duty of every State Board to inquire into this serious matter.

Two years of practical drug store experience *before entering college*, together with the college course and sufficient time in a pharmacy to make a total of four years, would certainly be an ideal condition. For this reason the two years of experience before entering college is a check on the practical training.

I have given this matter serious consideration and have as a result added the following paragraph in the catalogue of the College of Pharmacy I am connected with:

PRACTICAL EXPERIENCE.

Inasmuch as the candidate when taking the Board of Pharmacy examinations in most all the States of the Union is required to have four years of professional training in a retail pharmacy in which prescriptions are compounded it is very desirable that the student, *before entering the College, should possess some practical drug store experience.*

Such practical experience will also serve as a foundation upon which the student can build a solid structure. From the observance of our professors and instructors those students who are apprentices in a pharmacy can very readily comprehend the lectures and the laboratory work.

CONCLUSION.

Have we not wandered on the wrong road in our pharmaceutical education? Have we completely forgotten that excellent apprenticeship of old?

Do not let us educate "paper pharmacists," students who only look for a degree, but let all the colleges of pharmacy require practical experience as one of their entrance requirements!

ABSTRACT OF DISCUSSION.

L. E. SAYRE: When I first went to Kansas, I insisted upon practical experience, and that the statements thereto should be certified. We found, even under these conditions, that the reports could not be relied upon. The final decision arrived at was that it made no difference whether the students obtained their experience before or after college attendance.

As an instructor, my preference is for practical store experience after college attendance; too many young men come to school, after store experience, imbued with an idea that much of what is taught is unnecessary, or that they already know, and as a result they do not develop into good students.

If we could select the stores and the preceptors then it would be a different matter, but as a rule the experience of the clerk is not conducive to the making of a good pharmacist.

A MEMBER: It seems to me that a clerk is bound to learn something of value for his studies, and that it should be an easier matter to teach the one with some experience than one without any.

JOSEPH WEINSTEIN: I quite agree with Prof. Sayre, but only in part; most of the young men in the stores of New York are necessitated to gain experience that will be of value to them in school.

H. C. CHRISTENSEN: Speaking from personal experience, I had advantages over my room- and classmate, who had a better preliminary education, because of my store experience. I thought the matter of experience had been given approval long ago.

JULIUS A. KOCH: Educational institutions are acknowledging that practical experience is the best education; schools in engineering send their students into the machine shops. Pharmacy adopted the idea long before other technical schools thought of the value of practical experience. Are we going to give up this plan now?

IOWA'S PREREQUISITE LAW.*

BY J. M. LINDLY.

In considering Iowa's Prerequisite Law on this occasion, it is not necessary to enter into a detailed history of pharmacy in Iowa, although a few brief references thereto may be desirable.

The Pharmacy Law of Iowa was enacted in 1880. It has undergone several modifications during the thirty-seven years that have followed, but the essential features have continued to the present time. The administration of the law was placed in charge of the "Commissioners of Pharmacy," three in number, one of their duties being the licensing of those who wish to enter the practice of pharmacy. The original law provided for the licensing of all who were in the drug business at the time of the passage of the law. Subsequent admission was to be by two methods, either by examination before the commissioners, without regard to experience; or, without examination, on the presentation of a diploma from "an incorporated college or school of pharmacy" that required four years of experience

* Read before Section on Education and Legislation, A. Ph. A., Indianapolis meeting, 1917. (See also "Iowa Prerequisite Law," p. 928, October issue, 1917.)

including the time at school. These two methods of admission continued, with slight modification, until 1906, when all applicants for registration were required to pass a satisfactory examination before the commissioners of pharmacy. The change in 1906 provided that "Graduates of reputable pharmaceutical schools and colleges whose entrance and graduation requirements are equivalent to those prescribed by the American Conference of Pharmaceutical Faculties, for the year 1905 (this last phrase later eliminated), and whose course of study consists of two years of not less than thirty-six weeks each, shall be eligible to take the examination without proof of experience as hereinbefore defined." All others taking the examination must show four years of experience.

This change of 1906 did not prove to be entirely satisfactory. The graduate was regarded as competent professionally but deficient commercially. The licentiate, prepared in the school of experience, was considered as competent commercially but deficient professionally. In recent years, at the meetings of our Iowa Pharmaceutical Association, considerable discussion has been indulged, informally, concerning this subject. This discussion reached the point of concrete action last February while our association was holding a mid-winter meeting in Des Moines, at which time a resolution was unanimously adopted favoring the so-called prerequisite law or idea. Accordingly, some of the officers of our association, with the counsel of an attorney, who had formerly been an assistant in the Attorney-General's office, prepared a bill which was introduced by myself in the Senate, March 15th, known as Senate File No. 548, and which passed the Senate April 4th and the House of Representatives on April 12th, and went into effect July 4th of this year of 1917.

The most important feature of this bill is the requirement that all who would aspire to take the examination for registration as a pharmacist must have the prerequisite qualification of having "successfully completed the work of two college years in a reputable school or college of pharmacy," and have had two years of actual experience in a drug store. This "reputable school or college of pharmacy shall be such school or college of pharmacy whose entrance and graduation requirements are equivalent to those prescribed by the American Conference of Pharmaceutical Faculties for the year 1917."

What are the entrance and graduation requirements of such a school? Although it is presumable that the most of you are familiar with these particulars, it may be of interest to someone that these be here stated. Turning to page 203 of the Proceedings of the Seventeenth Annual Meeting of the American Conference of Pharmaceutical Faculties, we find (1) "The institution shall require of each candidate for graduation not less than 1200 hours of instruction, of which at least 500 hours shall consist of lectures and recitations. Such work to be given in a period of not less than fifty weeks, occupying not less than two full college years, and at least two months should elapse between these two years;" (2) "The requirements for admission of students to the school or college as candidates for any degree shall be: (*a*) A minimum age of seventeen years, except when the candidate is a graduate of an accredited high school or of an institution of equal grade, in which case no age limit shall be demanded; (*b*) Evidences of the satisfactory completion of education beyond the eighth grade equivalent to 15 counts

shall be required of each student. A count shall consist of one-hour instruction per week for a school year of 36 weeks," etc. This would mean the completion of the 9th grade in the public school as one of the requirements for entrance into the school of pharmacy.

The new law may be regarded as a compromise between the extremes found in the preceding law. Instead of four years of experience being required of the applicant who was not a graduate in pharmacy, only two will be required, and that will now be required of all, even of the graduate. Another provision, the aim of which is the easy adjustment of the new law to present conditions, is that any unregistered person who was clerking in a drug store at the time the law went into effect shall be allowed to complete his four years of apprenticeship and take the examination.

It may be asked why the first attempt to secure the enactment of the prerequisite law in Iowa was successful? This success may be ascribed to several facts and considerations. (1) Its advocates had a good talking point inasmuch as the Iowa statutes already required a much higher prerequisite educational standard for admission to examination for practicing medicine, law, dentistry, and even of veterinary medicine, than had been previously required of the pharmacists. Even this new pharmacy law does not come up to the standard set for some of these other professions. The proposed change sought in the pharmacy law was only an attempt to conform to the general spirit and letter of the Iowa statutes. It was only in keeping with the spirit of the times. (2) The Iowa Pharmaceutical Association is a strong organization. There are about 1700 drug stores in the state and there are about 1700 members in the association. The association is greatly aided in securing and in retaining members and in keeping alive a wholesome and active enthusiasm by two strong auxiliary organizations, one being the Iowa Pharmaceutical Travelers' Association, organized in 1908, and the other is the Iowa Druggists' Mutual Insurance Association, also organized in 1908. In the association itself is a legislative committee composed of one member from each county in the state. Besides this committee, there is the executive committee of three members, and there is the advisory board of eleven members, being one from each congressional district. All three of these committees may work in conjunction on legislative matters. By having a member of the legislative committee from each county, the committee has an extensive personal acquaintance with the members of the legislature. The influence of personal acquaintance is thus carried to the extreme. In connection with organization, it may be mentioned that during the last ten years there have been at times as high as sixty-five local N. A. R. D. associations or units, being city, town or county organizations. These, of course, were centers of influence. (3) A Bulletin, issued monthly by the Association, placed important information directly in the hands of the druggists of the state. If action was sought, direction was thus given to the rank and file. (4) During the past winter, fortunately, there were four members of the legislature who were registered pharmacists, three in the Senate and one in the House of Representatives, who gave their personal attention to such legislation as pertained to the affairs of the pharmacist. The chairman of the committee on pharmacy in each house was one of these pharmacist members.

ABSTRACT OF DISCUSSION.

W. C. ANDERSON: This is a very important paper because it teaches a very valuable lesson in the methods of securing prerequisite laws. In the first place, Iowa presents a very thorough pharmaceutical organization. I believe the paper states that practically every druggist in Iowa is a member of the State Pharmaceutical Association. There is the first foundation for successful work. The rest of the states are interested in knowing how Iowa does it, and I believe the fact that it has been accomplished in Iowa is an incentive to the workers in other states who place that as one of their ideals—every pharmacist in the state as a member of the state association.

The next important lesson that this paper teaches is that if we want to secure results in prerequisite legislation we must meet the conditions as they appear to-day, and not attempt to look into the future, some 10, 20 or 30 years, and legislate for what we would like to see pharmaceutical education at that time. The mistake that too many states are making to-day in trying to secure prerequisite laws is that they are striving for four years of high school for entrance, as part of their prerequisite requirements. They are paying no attention to the hundreds of boys in the state who have entered into the drug store life with the prospect of becoming licensed pharmacists, but cast them aside and say, "You have to come under these conditions the moment the law goes into effect." They are saying, "All your apprenticeship is lost practically, so far as the educational part of it is concerned, and you must go to a high school, and graduate from there before you can enter the practice of pharmacy."

Therefore, if we will take a lesson from this and make provisions for those who have entered pharmacy, the same as this bill does, and then make our entrance requirements to meet the present conditions of the drug business, rather than what we would like to see, perhaps we will be more successful in securing prerequisite legislation. This is a very valuable paper, and the druggists throughout the country, in states where there are no prerequisite laws, will appreciate having this information of how Iowa has been able to do it!

C. B. JORDAN: It strikes me there is one weak point in the law. That is, the standard is that of the Conference for 1917. Before that can be changed, even though the Conference changes its standards, that of the Iowa law remains the same until amended.

R. B. BIRD: It is a mighty fine thing if we keep up to date, let the future take care of itself. When it comes to enacting laws the greatest compliment, it seems to me, we can pay the Iowa people is that they are up to date.

C. B. JORDAN: You misunderstood my contention. Indiana will be glad to get anything. But this law specifically imposes the standard for 1917. That can not be changed without an amendment. My idea is to let the Board fix the standard, or simply adopt the standard of the Conference, without designation of the year, then the advancing standards would become effective.

C. M. WOODRUFF: The present-day tendency, you know, is to exaggerate the importance of vocational training at the expense of the importance of a liberal education. It seems to me the time will come, and perhaps has come, when you will have to have a prerequisite to the entrance to a college of pharmacy. You know in our high schools we have now selective courses. We have also selective courses in our colleges, and it is possible that a person can come through a high school, can even be a graduate of a college, without having a proper preliminary education qualifying him to enter a college of pharmacy. What shall an applicant for admission to a college of pharmacy be required to know before he is supposed to be qualified to enter upon the study of pharmacy?

THE CHAIRMAN: In reply to that, Mr. Woodruff, I want to say that the members of the Conference of Pharmaceutical Faculties have been working 19 years now to determine what should be the proper entrance requirements to a college of pharmacy.

C. M. WOODRUFF: They ought to know by this time.

W. C. ANDERSON: Just one word with reference to Professor Jordan's remarks as to the advisability of states framing their prerequisite laws along lines so that they always would come up to the requirements of the Conference. I believe the Iowa people have acted wisely in specifying the year of those regulations by the Conference. It is a very dangerous thing for any state to enact a prerequisite law providing that the requirements shall be such as are provided by the Conference, without any other specification. You can not know what these requirements will be, or whether they will be advisable to adopt.

J. M. LINDLY: In reference to the standard fixed for 1917 by the Conference, one reason was that the legislators might know something definite of the proposed standard. When an effort was made to defeat the bill, I went to the Governor myself and took this report along with me and showed him what this standard was.

Just one word more, and that was suggested by Dr. Anderson, and that is we do not wish to ask our legislators for something too radical. We have to meet the present conditions. Our situation in Iowa may be different from what it is in any other state. Our old laws were, perhaps, a little different, and we have to make the change in such a way that it will not seriously inconvenience the people or the druggists. There was an objection to the bill and that was it did an injustice to the poor boy. That is the reason for one clause of the law, allowing these boys, who had started in to clerk and put in their four years' apprenticeship, and those who were thus engaged at the time the law went into effect, to go on and complete the four years, and then take the examination. We do the best we can, all the time trying and striving upward. If we can't get all we want, we get what we can.

THE CHAIRMAN: The bill, as it was originally written, did not say the standards as set forth by the Conference of 1917, but it simply said the standards of the Conference of the Pharmaceutical Faculties. The reason the "1917" was put in was because we felt that we would not be able to pass the bill unless we put in a definite statement, as Senator Lindly has already pointed out. It is a weak point in the law.

W. F. RUDD: We have always to consider the reactionary forces in any community in which we live. We have them in Virginia, and those reactionary forces, while in the minority, somehow or other they manage to stand in the way of good legislation and block it before it gets real headway. It seems to me it is eminently right, that instead of providing a future standard, to have one adapted to present conditions and specific, as in the Iowa law, is best.

IOWA PHARMACEUTICAL ASSOCIATION.

The newsy monthly of the Iowa Pharmaceutical Association contains the following appeal to pharmacists, encouraging them in furthering the passage of the Edmonds Bill (H. R. 5531):

PHARMACISTS ATTENTION.

All over the country there is a feeling that pharmacists are entitled to greater consideration in the government service than has been accorded them in the past. It is impossible under present rules and regulations for a pharmacist to rise to commissioned rank in the Army on the basis of his pharmaceutical training and service. Conditions in the Navy are somewhat better, but the full rank of lieutenant or higher grades are not accorded those who rise from the ranks in the hospital corps.

No better opportunity than the present emergency has ever presented itself for the organization of a Pharmaceutical Corps officered by pharmacists and offering to the enlisted personnel, opportunities for advancement to commissioned rank.

The Government needs a Pharmaceutical Corps right now.

The people are entitled to proper pharmaceutical service in military as in civil life and will demand it.

The problem of securing the passage of the Edmonds Bill is now squarely up to the pharmacists of the country, and every druggist should write personal letters to his Congressional representatives urging the establishment of a Pharmaceutical Corps. Pharmaceutical organizations should hold special meetings if need be to draw up resolutions endorsing the measure. Active and energetic support of the Edmonds Bill is a duty that every pharmacist owes to his profession and to our armies in the field.

WOMEN'S SECTION

TEACHING THE PUBLIC.*

BY ZADA M. COOPER.

In selecting a subject upon which to write a paper I was unable to get away from the idea that we ought to undertake some definite thing each year or, perhaps, for a period of years. There ought to be concentration of effort; scattering our energies either brings no results or at best no tangible ones. We do not know what we are accomplishing or that we are accomplishing anything; the results are lost to us. Enthusiasm and interest are reduced to a minimum. Filled with the idea that we should adopt some definite plan and bend all our energies to accomplish the end sought, then I was confronted with the question what that one thing ought to be. This was no small task for as I have said before at these meetings, said until you are tired of hearing it, I fancy, the number of causes in which we might enlist are legion.

In the general work of the world there are many tasks for which women have leisure that men do not. Our grandmothers did everything for their households but factories and wholesale establishments have taken over many of those duties. It has been a natural evolutionary process but it has left many women unrealizing what has happened and it was responsible for much of the unrest among women during the last generation. Even yet we have not all found ourselves. The necessity of laboring for a livelihood has been a blessing to many of us. Some have had leisure which has not always been used to the best advantage and they have drifted into what Professor Ross calls "competitive ostentation." Surely the woman with little or much leisure owes it to herself and to other women and to the race to employ that leisure in some constructive work.

Then, too, there are many tasks for which women are peculiarly fitted. They have a little different view-point and this is no less true of things pertaining to pharmacy than of civics or politics. Every question to be well rounded out needs to be worked out from women's point of view as well as men's. *You* see phases of *your* druggist's problems that he can not see himself. *You* stand between him and the public. *You* are a spectator but you are *not* disinterested. *You* are sufficiently detached to have a better perspective. *You* hear the comments of other women, *you* know what the public complains of, *you* know both sides of the question.

After this long preamble which I suppose amounts to an attempt to justify my choice of work for the Section to undertake, I shall try to be specific.

The educational or publicity campaigns undertaken by several state associations during the last two or three years have appealed to me very much and it is some such work that I should like this Section to take up. The public needs education about the pharmacist and pharmaceutical things. Almost every phase of the profession about which the public has any idea, now, needs explanation both for the good of its individual members and for the benefit of pharmacists themselves. There is altogether too much misunderstanding and ignorance among people generally because until comparatively recent years it seemed to be the

* Read before Women's Section, A. Ph. A., Indianapolis meeting, 1917.

accepted policy to keep them in ignorance about everything that pertained to medicine. Not every sort of pharmaceutical subject can be handled by the Section because the membership is so largely non-professional but there are plenty of them that can be.

Most of you write papers for clubs and there can be no reason why you can not write papers about things affecting pharmacy. Consider a few of them. You know the pros and cons of Sunday closing, the advantages of shorter hours, the harm in much of the advertising, the evils of patent medicines. You know the menace of the drug peddler, you know why it is better to buy drugs at a drug store instead of a department store, you can boost prerequisite legislation. All these and many more you are prepared to discuss intelligently. Whatever you do toward educating the public reacts for the good of pharmacy professionally and financially. One thing especially fine you can do and, perhaps, you only and that is to teach the public to demand women behind the counter as well as men. If the women demand women druggists the men will see as they have not seen before their value as business getters. The value to the business man is not secondary to the service rendered to women druggists.

Two state associations have been doing very notable work with their educational bulletins or, perhaps, I should say I know about such work in two states. Perhaps others are doing just as much. I refer to Pennsylvania and Minnesota. Some of the subjects that these states have treated will show you, I believe, that you too may have valuable suggestions to offer. Notice carefully the following subjects: Instances of how the pharmacist serves the public, Fraudulent advertising of proprietary medicines, Formula disclosure bills, Coupons and trading-stamp legislation, Pharmaceutical service—its seriousness and responsibility, High prices encourage drug adulterators, The consumption of drugs, Beware of quacks—buy of druggists, Advance in drug prices, Unrestrained sale of drugs scored.

I do not know what machinery would be necessary to put such a plan as this into operation and to keep it working successfully. I have wondered if it might not be undertaken by the Press Committee even though it may differ somewhat from the work usually expected of that committee. Or, if it seemed wise a special committee might have it in charge although in general I believe there is serious objection to multiplicity of committees. Should this be delegated to the Press Committee, the scope of articles would be very much broadened. Instead of being limited as it is now to articles about the Women's Section or those of interest to women of the Section they would have the task of getting papers on any subject appropriate for this publicity and educational work. These papers might be offered to drug journals with the suggestion that every druggist try to get them published in local newspapers. However, it seems probable to me that it would be far better if they could go through the hands of the regular state association committees because of their having a well-organized machine for handling them. I am, of course, assuming that these publicity committees of state associations would use such articles when offered them. Perhaps they wouldn't but I can not help feeling sure that they would if the articles were well written and timely. I suppose there is a great quantity of material written that never gets printed but really good things, I believe, are not often refused. The author of the article and

the Women's Section would both receive credit. We should know that we were doing something definite. Our Press Committee might go a step further if it seemed best and instead of soliciting papers to come at any time on any sort of subject a special list might be prepared for each month or every three months. Such a list might, perhaps, be published in the JOURNAL or sent out in any other way that seemed best.

This whole notion of mine may be altogether visionary. Perhaps it can't be done. Perhaps it isn't even a good thing to attempt. I have not discussed the subject with anyone but I hope that it will be discussed freely even if the discussion should be mostly criticism. If there is any value in it then others may have better ideas of how it might be carried out.

CHEMISTRY OF THE HOUSEHOLD.*

BY MARY L. CREIGHTON.

The chemistry of the household deals very intimately with many important topics among which are the air we breathe, the food we eat and the best methods of preparing and preserving it, the selection of cooking utensils and their proper care, choice of textiles with reference to "fast colors" and effect of certain dyestuffs upon the fabric, bleaching agents and stain removers, chemical agents for the softening of "hard water," the selection of both toilet and laundry soaps, the problems of artificial light and heat, etc., etc. Under the head of food materials attention must also be given to the character of the various condimental and flavoring agents and baking powders. In fact, the domestic applications of chemistry are so many and so varied that it would be impossible, within the limits of a brief paper, to even refer to them all.

One of the most important subjects which claims attention in the household is the securing of an abundant supply of pure air by means of proper ventilation. We are proverbially careless in regard to providing our homes with an abundance of oxygen—which we know to be as essential as food—but because it may be had for the taking and is not obtained through the medium of the check-book we do not appraise at full value.

Next in importance to fresh air is the food we eat. The principal classes of organic foods are the fats, the carbohydrates—starches and sugars—and the proteids, of which last nitrogen is the essential element. The function of protein is the building and the repair of body tissues, hence animal life can not exist without it. The supply is obtained from lean meat, eggs and some kinds of vegetables.

As a nation we use an excessive amount of protein, a fact which has led to the construction of tables showing those combinations of fats, carbohydrates, minerals, acids and protein which will give most satisfactory results in keeping the human machine up to the highest point of efficiency by meeting its special requirements. The selection of foods must, of course, be governed very largely by circumstances, the industrial worker requiring not only different food materials but a larger amount than the brain worker who takes but little physical exercise.

The scientific training in household science which is now recognized as a factor in the practical education of thousands of young women, and the increasing

*Read before Women's Section, A. Ph. A., Indianapolis meeting, 1917.

general interest shown in this subject during recent years are hopeful signs for the future, since such a course of study has as its very foundation a knowledge of the chemistry of foods as it applies to their selection and preparation. Never before in the history of this country was such attention paid to the question of foods and food values. We hear constantly of the "balanced ration" and of the necessity for a thorough understanding of the chemistry of foods in order that the body may be well nourished with a minimum of expense.

This subject leads naturally to that other one, What garden vegetables are most profitable from the dual standpoint of food value and money value? Also, what crops are best adapted to certain kinds of soil, and how best can the fertility of the soil be maintained by the replacement of chemical substances which have been removed by growing crops? All plants require a sufficient amount of the elements hydrogen, oxygen, carbon, nitrogen, sulphur, phosphorus, calcium, magnesium, potassium and iron, while still other elements are essential to certain kinds of plant life. The fertility of American farms and gardens must be maintained, or restored, in order to provide the largely increased food supply which the times demand.

We have heard much in the past of "intensive farming," but the summer of 1917 has shown a marvelous increase of interest and enthusiasm in this direction, especially among amateur gardeners. Thus the school boys and girls of to-day are learning in a very practical way that chemistry, instead of being a subject of study to be feared and dreaded, is their strongest ally in the partnership with nature upon which they have entered.

The attitude frequently assumed by students toward this highly interesting and valuable branch of their scientific training reminds one of the story of the small boy who, when walking along a lonely road, saw a ghost-like object ahead which, when bravely approached, proved to be a friendly guide-post.

There are comparatively few lines of work in which a knowledge of chemistry and its practical applications will not prove helpful. In addition, the thousands of so-called school gardens are destined to teach their owners far more than mere soil adaptability and how many crops can be harvested from a small plot of ground intelligently planted and tilled. There will be other lessons of thrift, industry and economy that will prove valuable assets both to the individual and to the community in which he lives.

Following the choice of foodstuffs, the chemistry of cooking deals with the best and most practical methods of preparing the different articles for the table, and necessitates a working knowledge of the nature of the materials to be dealt with and of the object sought in their treatment. This is a subject of such extent and importance as to place it in the front rank of household interests.

The purposes of cooking are, to render food palatable by improving its flavor, to aid digestion, and in general to make it more healthful, the particular method employed depending upon the final object to be attained. For example, a broiled steak retains its juices, while if it is desired to extract them the meat is placed in cold water and cooked slowly.

Of the many different ways in which the winter's supply of fruits is cared for—drying, canning, preserving and the making of jams, marmalades and jellies—the last named is usually considered the most difficult. However, with a proper

understanding of the conditions which must be met, jellies of all kinds may be easily prepared.

Careful experiments have made possible the formulation of certain rules for procedure in the handling of fruit juices. These must contain *pectin*, the constituent upon which the process of jelly-making absolutely depends, and if it is shown by a simple chemical test with ethyl alcohol that pectin is not present it must be supplied.

Fruit juices which are both acidic and rich in pectin, as grape and currant, offer the least difficulty, and for these the old-time method of measure for measure of sugar and juice may be safely employed, the amount of sugar necessary in any case depending upon the proportions of these constituents present.

The bread required for the household is a matter of prime importance, especially the quality of the flour from which it is prepared.

The consideration of the questions of a pure water supply and of pure milk are problems for the community rather than for the household.

A knowledge of the chemical composition of metallic cooking utensils will enable the user to select such as are least liable to corrosion, and also aid in the application of effective cleansing agents not likely to be destructive to the vessel itself.

We have been accustomed to think of graduated glassware as belonging to the equipment of the chemical laboratory, but graduated measuring vessels of glass are now at home in the modern kitchen cabinet. From the sanitary point of view, it is also interesting to note that the glass mixing spoon and glass rolling-pin have largely replaced those made of wood, and that a plate-glass slab now offers a great improvement over the old-time moulding board, while the chances are that pastry prepared on this slab, with an ice-filled glass rolling-pin, will be baked on a glass pie-plate in an oven so constructed that the process is open to inspection.

Many grades of ware, for which we are largely indebted to the chemist's art, find use in the household, from the coarser pieces of stoneware to the decorated china table service of delicate pattern and design. Perfect glazing is a necessity for table ware, and the addition of certain chemical compounds to the glazing material has made possible the varied and beautiful tints now shown in the better grades of porcelain.

While the shortage of dyes formerly imported has been the cause of considerable apprehension, the recent displays of bright-colored fabrics has seemed to be unusually large and indicates that members of the household will not of necessity go clad in sombre garments. And the pride exhibited by the people of the United States in using and wearing, as far as possible, articles "Made in America" goes to show that this country is not likely to take any backward steps along these lines, even should the hoped-for time soon come when it would no longer be essential that we depend upon home manufacturers for the commodities hitherto obtained from abroad.

In conclusion: The chemistry of foods is evidently a subject which has come to stay in the American home, and let us hope that its wise study in our schools and its general application to daily needs will exert an influence upon the public health that shall be lasting in its benefits.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws, Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be *plainly* written, or typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter.

CITY OF WASHINGTON.

Most of the time of the October meeting was devoted to a detailed account of some of the activities of the parent Association at the Indianapolis meeting, and of the section of pharmaceutical chemistry of the American Chemical Society at Boston.

On December 5th Mr. Frank Rabak of the Office of Drug Plant and Poisonous Plant Investigations of the Bureau of Plant Industry gave an interesting illustrated talk on the development and future possibilities of the essential oil industry in the United States. He emphasized especially the possibility of utilizing the large quantities of waste apricot, almond and cherry pits which were formerly shipped to Germany for making oil of bitter almonds. Mr. Sievers of the same office presented a paper on poisonous plants as sources of insecticides, and Dr. Stockberger spoke of the development of the peppermint industry on the west coast.

Mr. Flemer mentioned the fact that the Wilbert library comprising some 1500 volumes was still awaiting a purchaser and it is hoped that the members of the Association will advertise the matter among their acquaintances.

Report of a Meeting of the Washington Branch of the American Pharmaceutical Association held Dec. 27, 1917:

Mr. Lewton reported that adequate provisions existed in the National Museum for the custody and display of specimens illustrative of Historical Pharmacy. Members having material of this nature or knowledge of such are urged to communicate with Mr. Lewton.

The National Museum would prefer, wherever possible, that the specimens be offered as outright gifts, but where this is not desirable or feasible, it will gladly accept as loans or deposits, valuable material on the subject of pharmacy, materia medica, and the history of pharmacy. It is customary for loans to be accepted with the understanding that they will be left undisturbed for a year or more, while deposits are usually made for a longer indefinite period. The museum can not bind itself to permanently install any exhibit, or to keep any certain assemblage of specimens always exhibited to public view. It can, however, agree to safeguard them and keep them available for examination and study whenever desired. In order to avoid duplication of material, the Museum would request that all exhibits offered it as gifts, loans or deposits, be first arranged for by correspondence and the submission of a list or inventory giving an idea of the character and quantity of the material offered.

Two communications from Dr. W. A. Puckner addressed to Mr. Hilton were presented. These communications asked that some action be taken on a proposed code of ethics between pharmacists and physicians for the purpose of eliminating a certain antagonism which it was claimed existed between pharmacists and physicians. Discussion followed as to whether any tangible antagonism actually existed between the two bodies, the prevailing opinion being that none actually existed. Mr. Flemer thought that any movement tending to bring about a better recognition of pharmacists in the government service was worthy of consideration and this might be an opening to attain the end desired.

It was felt that good might be accomplished by sending a resolution from this branch to the parent body embodying some plan by which more cordial relations between pharmacists and physicians could be established.

It was moved that a committee be appointed to consider the problem, to determine how more cordial relations between pharmacists and physicians could be promoted, especially the recognition of pharmacists in the government service and improving the situation with respect to pharmacy in the government service, and to report at the next meeting.

CHICAGO.

The ninety-second monthly meeting of the Chicago Branch of the American Pharmaceutical Association was held Friday evening, December 21, 1917, at Kuntz-Remmler's Restaurant with about 30 members and friends in attendance, president Hugh Craig in the chair.

The Chair appointed as the committee to confer with a similar committee from the C. R. D. A. on making the Branch meetings more attractive to retail pharmacists the following: Messrs. Eicher, Gray and Von Hermann.

The following nominating committee was appointed: Messrs. Day, Storer and Gathercoal. Dr. Bernard Fantus was named chairman of the committee to arrange and care for the proposed exhibit of U. S. P. and N. F. galenicals at the A. M. A. meeting in June 1918, with authority to choose his own associates.

Under committee reports James H. Wells called attention to the large amount of national, state and local legislation of interest to pharmacists. S. C. Henry, Prof. W. B. Day, Dr. J. H. Beal and C. A. Storer discussed the report.

Dr. J. H. Beal as chairman of the Special Committee on Compulsory Health Insurance responded with the statement that the final report of the committee would be ready for the next meeting. He discussed the extent and manner of the propaganda now being carried on in this country in favor of this legislation and of the secrecy maintained as to the real source of the movement and of the money by which it is being carried on.

The Secretary urged the importance of a large attendance to hear this committee report at the next meeting.

General Secretary W. B. Day presented the leading subject of the evening, "National Pharmaceutical Service." He presented in abstract the provisions of the Edmonds Bill and discussed them briefly. He referred to amendments that have been suggested. In his opinion, the provision requiring that candidates for the higher grades of officers must be graduates in pharmacy is very important. Upon it would depend the formation of a reserve corps in which the students in colleges of pharmacy might be enlisted and thereby enabled to complete their courses. In this bill, pharmacy is asking recognition on the same basis as that given medicine, dentistry and veterinary science. But physicians, dentists and veterinarians must be graduates of their professional schools. If pharmacists now demand that they be accepted regardless of professional training, they greatly weaken their position and endanger their prospects for recognition. He called attention to the provision for promotion from the lower to the higher ranks and strongly urged all pharmacists to make a united effort to secure the passage of the bill in substantially its present form.

The Edmonds Bill was further discussed by Thos. Potts, Harry Hood, E. Von Hermann, E. H. Wisner and others. The point especially dwelt upon was that pharmacists must get back of this bill with a united front and all of their power. They must appear before the congressional committees having the bill in charge and tell them of the absolute need of trained pharmacists in the medical work of the army and why pharmacists are worthy of the recognition asked for. Unless those interested in the bill become very active and lay their cause fully before these committees the bill will receive scant attention and fail of passage.

The following endorsement was unanimously approved:

"The Chicago Branch of the American Pharmaceutical Association strongly endorses all sections of the Edmonds Bill (H. R. 5531), a bill to increase the efficiency of the Medical Department of the United States Army, to provide a pharmaceutical corps in that department, and to improve the status and efficiency of the pharmacists in the Army, and further urges pharmacists to vigorous activity in behalf of the bill, especially calling upon their congressmen to work and vote in its favor."

The present status of the alcohol situation was discussed by S. C. Henry, President Craig and others. Mr. Henry said that no new rulings had been promulgated during the month but that enlightenment regarding a number of the previous rulings was still being sought. Mr. Craig stated that with the commandeering of wood alcohol by the government, the sale of medicated alcohol, which is permitted only to druggists, should be considerably increased. Professor Day questioned as to whether alcohol medicated with 1 percent phenol and somewhat diluted with water might not be used as a beverage.

An exhibit of adulterated crude drugs was made by Secretary Gathercoal and included a number of drugs recently reported adulterated by the Department of Agriculture. Among the adulterated drugs shown were samples of

stramonium, jalap, buchu, belladonna leaves, cantharides, senna, *viburnum opulus*, etc.

The subject of substitutes for glycerin and sugar in U. S. P. and N. F. galenicals was introduced by President Craig by a statement regarding the great lack of sugar in New York and the work of the Druggists' Sugar Committee in that city.

Wm. Gray and I. A. Becker spoke on the use of sugar substitutes, especially invert sugar or corn sugar. Harry Hood dwelt upon the fact that druggists were already cutting down their sugar consumption to one-half of their former requirements.

Secretary Gathercoal mentioned the addendum to the British Pharmacopoeia that has recently been compiled and published dealing with sugar and glycerin substitutes utilized by English pharmacists. He stated that a copy had been ordered by mail and hoped it would be available for the next meeting.

President Craig called for volunteers to undertake experimental work along these lines and to report at the next monthly meeting.

E. N. GATHERCOAL,
Secretary.

CINCINNATI.

Abstract of lecture delivered by Dr. C. T. P. Fennel before the Cincinnati Branch of the American Pharmaceutical Association, January 8, 1918, on "The Manufacture, Preparation and Uses of Antitoxins and Serums" (Illustrated):

For a typical process of manufacturing antitoxins for the cure of certain infectious diseases, the one best known and most widely used of all antitoxic sera is the antidiphtheric serum. The process of manufacture of the other antitoxic sera, which have a place in medicine, differs but little from it. While the general plan of work is practically the same in all laboratories, individual methods may possibly differ somewhat, but there are no "secret processes;" and if there appear to be any, such may be set down almost entirely and safely to the imagination of the persons employing same.

A visit to a biological laboratory where this work is done on a large scale, while it is highly interesting and instructive, gives to the uninitiated very little idea of the expense attendant upon furnishing and operating such a plant, for the various pieces of apparatus have mostly to be manufactured from special designs to suit individual requirements, and time and requirements are constantly changing. In fact, the necessarily high scientific character of this work itself and the persons in charge of such laboratories precludes the idea of secrecy.

Dr. Fennel lays particular stress upon the necessity of observing absolute sterile cleanliness in all biological work, showing the sterilization of containers, apparatus and materials by subjecting same to steam under pressure for thirty minutes for three successive days, thus insuring the destruction of any bacteria in or on the apparatus, as well as the killing of the spores, which are so very resistant to all forms of sterilization.

The requirements for the development of culture media are darkness, warmth and moisture, as well as special meat presses and steam-jacketed kettles for making the bouillon.

The prepared culture media are then placed in five-liter flasks, each containing two and a half liters, stoppered with cotton and the necks covered with wax paper. These flasks are then placed in a specially constructed apparatus, which permits the sterilization of one hundred and fifty of these flasks at one time.

The diphtheria bacillus was discovered in 1883 by Klebs and in 1884 by Loeffler and is commonly known by the names of these two distinguished men as the Klebs-Loeffler bacillus. Behring, Litasato, Roux and others contributed to a method of immunizing against the organism, and Ehrlich designed a method of estimating the power of the toxin and of the antitoxin. Millions of these bacteria are required to form a colony as big as the head of a pin. As they multiply in the nose and throat of the patient, they excrete a powerful poison which is absorbed by the patient and causes the train of symptoms characteristic of the disease known as diphtheria.

In order to manufacture an antidiphtheric serum, it is necessary to have a pure culture of the causative factor, the diphtheria bacillus. While all great laboratories usually keep on hand pure cultures of the diphtheria germ, a method of obtaining the bacterium is to collect the organism from the throat and nose of patients having diphtheria. This method is, of course, of great value in confirming the diagnosis in suspected cases. Take two test-tubes, one containing a wire or a small stick of wood, charged with a pledget of cotton at its lower extremity. The other contains Loeffler's blood-serum culture mixture. The contents of both tubes are, of course, absolutely sterile. The swab is withdrawn with

the stopper, and gently passed over the exudate in the throat of the patient. It is then lightly passed back and forth over the surface of the solidified blood serum. This process transfers from the patient to the cotton swab a large number of the germs present in the throat and nose, and from the cotton swab they are again transferred to the surface of the culture media. The now inoculated culture tube is returned to the laboratory as soon as possible and placed in the incubator where it is kept for 18 to 20 hours.

Now one of the large flasks of prepared culture media taken out of the large sterilizer is inoculated with a pure culture of the diphtheria germ. This is known as a "Starter Flask," which is then transferred to the incubating room. After the starter flask has become saturated with the diphtheria germs and their toxic products, it is used to inoculate a large number of other flasks. These flasks are all numbered and returned to the incubating room, where they are kept a number of weeks, during which time the bacteria multiply, developing a toxin which goes into solution in the bouillon. After that, under proper manipulation, all of the bacteria are filtered out of the bouillon, the fluid obtained being absolutely sterile and bacteria free. This filtered toxin is transparent, sparkling and light amber in color. The filtered bouillon, containing the diphtheria toxin in solution represents an exceedingly powerful poison, however, of unknown potency. Unlike other poisons, such as morphine, strychnine, brucine, etc., where the safe therapeutic and lethal dose is known, the bacterial poisons do not give such definite knowledge. Ehrlich's method, however, is now in universal use for measuring the power of diphtheria poison. Guinea pigs of standard weight (250 Gm.) furnish the principle of Ehrlich's method by the resistance shown to the toxic effects of toxins.

Dr. Fennel pays tribute to all manufacturers of antitoxin for the excellent and humane treatment accorded the horses used for this purpose, saying they are carefully groomed, fed and watered and watched over with as much care as patients in a well-regulated hospital.

After the horse has passed all the tests (tuberculosis, glanders, etc.), he is brought into the operating room and an initial dose of (usually) 0.1 milliliter of the toxin, combined with an appropriate amount of standard test antitoxin, is administered. This is injected under the skin and usually causes the horse to undergo a reaction. He may have a chill, a rise of temperature, a rapid pulse, stary eye, rough coat, urinate frequently, liquid bowel movements, generally weak and every symptom of being ill, however recovering after a few hours or a day. Then a larger dose of toxin is administered. He goes through the same experience several times until he reaches finally a dose of about 250 milliliters or 2500 times the original dose.

During this process there is developed in the blood a substance known as antitoxin which neutralizes the toxin. The horse is now considered immune as he possesses in his blood stream sufficient antitoxin to withstand, overcome or neutralize the immense amount of toxin administered to him at one dose. Some time is required for this process to become complete, the average being from three to five months. When the horse is completely immunized he is ready to be bled. This immune horse is placed in the operating stall, a site over the external jugular vein is thoroughly scrubbed and sterilized. A sterile trocar is inserted into the jugular vein, the stylet removed and the canula connected with a sterile rubber tube which passes into the large blood tube, passing through a cotton stopper. From five to seven tubes, with a capacity of 1500 to 1800 mils each, are nearly filled with blood from each horse at a single bleeding, the quantity depending upon the size of the horse. The bleeding does not injure the horse in any way. These filled blood tubes are kept at a low temperature until the clot forms. The clot in forming encloses in its meshes of fibrin nearly all of the blood corpuscles and sinks. While the blood clot itself no doubt contains a great deal of antitoxic value, it is customary to use only the liquid blood serum. To this clear blood serum a 0.4 percent addition of cresols is made as a preservative. After being again subjected to examination by expert investigators for the detection of any bacteria, and then even more searching physiologic tests, it is then ready for the testing of its antitoxic powers.

The process of testing antidiphtheric serum for its antitoxic power is much like that of testing the toxin, but in reverse. The object of this test is to determine as closely as possible the least amount of antitoxin which will just neutralize, and no more, the already determined killing dose of the toxin. The antitoxic unit value of the serum having been determined and the serum having passed several searching

tests for purity, it is now placed in the different packages demanded by the medical profession.

CHAS. A. APMEYER,
Secretary.

CUBA.

The meeting of the Cuban Branch of the American Pharmaceutical Association was held at Havana, January 10th, Dr. J. G. Díaz presiding. Sixteen members were present. Secretary Alacán read the minutes of the preceding meeting, which were approved.

President Díaz declared that he had called the meeting in order to announce to the members the recent death, January 1st, of Prof. Joseph P. Remington, reading the following tribute:

"The present year begins sorrowfully for our profession. On the first day of January, Dr. Joseph P. Remington, the leader of American pharmacists, passed away at his residence, 1832 Pine St., Philadelphia.

"Professor Remington was born on the 27th of March, 1847. His father Dr. Isaac Remington was a distinguished physician of that time. On his mother's side he descended from Townsend Speakman, one of the oldest Philadelphia pharmacists, and inherited from his ancestors that love of work and study which, from his youth, gave character to his personality. While a student, he showed his powerful imagination and his inventive genius by constructing apparatus needed in the laboratory he had formed for his own use.

"He began his apprenticeship in January, 1863, at the age of sixteen, with the firm of Charles Ellis, Son and Co. He then commenced his course in pharmacy at the Philadelphia College of Pharmacy, graduating in 1866. He went then to New York and worked for three years with Dr. E. R. Squibb under whose direction he obtained the vast practical knowledge he possessed in analytical and manufacturing work. Owing to his mother's death he returned to Philadelphia where he worked for four years with the firm of Powers and Weightman. When he left that firm he started in business for himself, until, called in 1871 by Prof. Edward Parrish, he became his assistant in the Department of Theory and Practice of Pharmacy of the Philadelphia College of Pharmacy, which that celebrated teacher occupied until his death. He was retained in this position by Prof. Parrish's successor, the no less famous Prof. William Procter, Jr., after whose death, in 1874, Remington was appointed professor of the above-mentioned chair. In 1879 he was made director of the Pharmaceutical Laboratory, and in 1893 dean of the college.

"In his forty-six years of teaching he distinguished himself not only for his extensive knowledge, which he presented with admirable clearness to his pupils, but also for the inexhaustible kindness of his soul. Five years ago I attended one of his lessons, and at the end of it his students surrounded him with such respect and signs of affection that he seemed more than a teacher, a loving father in the midst of his children. Few men have had such power of attraction over their followers. On that occasion he had an encouraging word for each one and for all the sweet smile that distinguished him and which was not incompatible with the greatest firmness of character.

"Prof. Remington's activity was astonishing. There is no medical or pharmaceutical publication in the United States to which he has not contributed, and each one of them contended for the honor of inserting his writings that reflected his powerful imagination and his profound and varied learning.

"As an author he leaves us his excellent work 'Practice of Pharmacy,' as well known in the United States as in England, France, Germany and Cuba.

"In collaboration with Dr. Horatio C. Wood, professor of Materia Medica and Therapeutics of the University of Pennsylvania, and with Dr. Samuel P. Sadtler, professor of Chemistry in the Philadelphia College of Pharmacy, he has been publishing, since 1879, the 'United States Dispensatory.' This work is a true professional monument in which all the official drugs of the British and American Pharmacopoeias are studied, and, besides, the most important ones not included in those works. Since 1879 he has been the pharmaceutical editor of 'Lippincott's Medical Dictionary.' But the work to which he devoted his greatest energies and, during his last years, the greater part of his time, was the 'United States Pharmacopoeia.' Under his direction were published those of 1890, 1900 and the ninth revision, recently printed. He had accepted this task, from which he derived no material profit, as a patriotic work, his chief pride being that the scientific inheritance bequeathed him by the memorable and most worthy Dr. Charles Rice, former chairman of the Committee of Revision, should not decrease.

"In December 1910, he visited Cuba. The students of the School of Pharmacy tendered him a lunch in the gardens of 'La Tropical'

and presented him with a flag of the School, which he prized greatly, and placed on the wall of his study. On January 5, 1911, the pharmacists of Havana gave him a farewell banquet, and in answer to the toast addressed to him by the writer of these lines, he drank to the happiness of Cuba and declared himself a true friend of the Cubans, an assurance which he made good whenever the opportunity offered itself.

"In September 1915, at the meeting of the American Pharmaceutical Association in Atlantic City, N. J., upon Dr. Alacán's suggestion that the next convention should meet in Havana, Prof. Remington so warmly seconded the motion praising in the highest terms Cuba and the Cubans, that we came very near carrying the point, and should have succeeded had not the powerful reasons of time and climate caused the protectors of the idea to desist from their purpose. That convention chiefly composed of professors of the medical and pharmaceutical colleges of the Union must meet some time between July and September, and in that season of the year the excessive heat of our island makes it impossible to hold the convention here.

"Prof. Remington's interesting conversation was always brightened by witty and opportune anecdotes from which some profitable lesson could in every case be drawn, and he always held the interest of his hearers. He had the good fortune to see his principal aims in life fulfilled. He wished to make a home, and formed a model family; he wished to be a teacher, and enjoyed in that capacity an enviable reputation; he undertook the direction of the Committee of Revision at the time when Dr. Charles Rice had stamped upon it the seal of his prestige, and so successful was he in the endeavor that it will be extremely difficult to find his substitute. The cause of all this, is that Remington devoted his whole time and his whole activity to any enterprise confided to him, feeling sure that, as he said many times: 'Fortune smiles at him who works and waits.'

"His life was not exempt from difficulties; but to those few who opposed him he gave as an answer his renewed efforts to achieve success in his undertaking. Work constituted his greatest pleasure, and he seemed to have adopted as a motto Thomas Jefferson's advice to his daughter: 'A mind always employed is always happy.' This is a true secret, the grand recipe for felicity. The idle are the only wretched.

"I have lost an excellent friend, Cuba a good friend."

Dr. Sylvia Alacán moved that a letter of condolence be sent to Prof. Remington's family and also to the Philadelphia College of Pharmacy, seconded by Dr. Remirez and carried. Adjourned.

JOSÈ P. ALACÁN, *Secretary.*

DETROIT.

The regular meeting of the Detroit Branch of the American Pharmaceutical Association was held at the Wayne County Medical Bldg., January 18th. The plans for the February and March meetings were discussed and a motion was made and carried to hold a joint meeting with the Prescott Club at Ann Arbor, February 14th.

Mr. Wendell, Display Manager of the J. L. Hudson Co., will be present at the March meeting. Miniature window displays will be exhibited and the methods of obtaining the best results will be discussed. Dr. Lescohier of Parke, Davis & Co., will also give a talk on Biological Preparations, Serums, Antitoxins, Vaccines, etc. MAY STRAWN, *Secretary.*

NEW YORK.

The January meeting of the New York Branch of the American Pharmaceutical Association was called to order by President Jos. L. Mayer in the lecture hall of the New York College of Pharmacy on Monday evening, the 14th, at 8.30 o'clock.

Sixty-two members were present.

The regular order of business was changed. The memorial meeting in honor of Charles Holzhauer and Joseph Price Remington was opened with a few words of appreciation by President Mayer.

The following then paid tribute to the deceased in beautiful words: Dr. H. H. Rusby, E. A. Sayre, C. F. Schleussner, E. G. Eberle, Dr. A. R. L. Dohme, Dr. H. V. Arny, C. O. Bigelow, Prof. C. H. LaWall, J. W. England and E. W. Runyon. Letters were read from George M. Beringer, Dr. V. Coblentz and Prof. W. B. Day.

Dr. Jeannot Hostmann then read the following resolution on the death of Mr. Holzhauer:

IN MEMORIAM.

"Charles Holzhauer has answered the call that has taken him to the great beyond. Actively engaged in retail pharmacy for over fifty years, he leaves behind him a record of achievements well worthy of emulation. Honest, useful, thorough, untiring—are some

few of the adjectives that may be truthfully applied to his life's work. He believed in the Golden Rule, and believing in it, he lived up to it. He was devoted to his family, to his friends, to his profession, to his church, to his associations—in fact—he was devoted to everything he was interested in and he was interested in everything that makes this life worth while. His advice, often sought and usually found sound, was born of a nature absolutely unselfish and noble. Well may we repeat the words of the poet:

"'To live in the hearts we leave behind us is not to die.'

"In so far that the members of the New York Branch of the American Pharmaceutical Association wish to express their heartfelt regret caused by the taking away of their fellow-member, Charles Holzhauer, be it

"*Resolved*, That these words of appreciation be inscribed upon a page set aside in the minutes of this meeting, and be it furthermore

"*Resolved*, That the Secretary be instructed to send a copy thereof to the widow of our deceased member."

It was regularly moved, seconded and carried that these resolutions be adopted.

This concluded the memorial meeting. The regular business meeting was immediately opened. Because of the lateness of the hour the reading of the minutes of the preceding meeting was dispensed with.

Membership Committee: The following applications for local membership were acted upon favorably: Edward A. Sayre, 482 Broad St., Newark, New Jersey; E. W. Runyon, 200 Sixth Ave., New York City.

The application for membership in the parent organization of Lionel T. Andrews, 3917 Syosset Street, Woodhaven, L. I., was passed upon in the usual way.

Committee on Fraternal Relations: The committee because of the lateness of the hour merely reported progress as did also the chairman of the Committee on Progress of Pharmacy and of the Committee on Legislation and Education. The Committee on By-Laws reported that a set of By-Laws would be presented at our next meeting.

Committee on Nominations: Dr. H. V. Arny brought the following ticket which was endorsed by all members of this committee:

President, Frank L. McCartney; *Vice-President*, J. L. Turner; *Secretary*, Hugo H. Schaefer; *Treasurer*, Gustave Horstmann. The chairmen: *Progress of Pharmacy*, George C. Diekman; *Fraternal Relations*, J. Leon Lascoff; *Legislative Committee*, Robert S. Lehmann; *Membership Committee*, T. F. Currens.

Unanimously endorsed by Hugo Kantrowitz, Thomas Latham and Henry V. Arny.

It was regularly moved, seconded and carried that the ticket be unanimously elected by one ballot cast by the chairman of the nominating committee.

The following committee was then appointed to escort the newly elected president to the chair: Dr. H. V. Arny, Dr. George C. Diekman and Dr. Jacob Diner.

President McCartney with a few appropriate words thanked the members for the honor conferred upon him.

It was then regularly moved, seconded and carried that a rising vote of thanks be awarded the outgoing president and the secretary.

HUGO H. SCHAEFER, *Secretary*.

NORTHWESTERN.

The December meeting of the Northwestern Branch of the American Pharmaceutical Association was held December 5, 1917, at the College of Pharmacy, University of Minnesota, Minneapolis, Minn. President Truman Griffen convened the session. The record of the last meeting was read and approved. Prof. E. L. Newcomb reported favorably on the work of the general membership committee for Minnesota. A detailed report of the Wulling Testimonial Dinner was presented by the secretary and treasurer. Deep regret of the demise of the late President Holzhauer and Charles Caspari, Jr., was expressed from the floor and upon motion the president was requested to appoint a committee to formulate suitable resolutions. About one hundred persons attended the interesting and instructive program of the afternoon.

(1) "The Edmonds Bill," by Dean F. J. Wulling.

In his explanatory discussion Dean Wulling clearly indicated the real purport of this measure. The speaker urged all pharmacists to actively support the National Pharmaceutical Service Association and any other similar organizations that have for their purpose the securing of recognition of pharmacists in the government service. Dr. Wulling concluded his remarks with a stirring and patriotic appeal for more efficient pharmaceutical service to the country. Copies of application blanks for membership in the National Pharmaceutical Service Association were distributed and a number of pharmacists joined.

(2) "A Discussion of the War Revenue Law," by W. G. Noyes.

Possibly no one in the northwest was better qualified to discuss this law than Mr. Noyes of Noyes Brothers and Cutler, St. Paul. His remarks were very instructive as well as most interesting. Many of the problems that are continually arising concerning the application and enforcement of this law were cleared up by the speaker. Mr. Noyes solicited any queries and a number of pharmacists entered into the discussion with profit to all.

(3) "The Chemical Investigation of the Resins of *Datura Metelloides*," by Prof. Chas. H. Rogers.

Attention was called to the importance of thorough chemical and pharmacological investigation of the "extractive matters" of drugs in order that, by a clearer understanding of the chemistry and pharmacology of these so-called "inert substances," a better knowledge might be had of the part they play in conjunction with the principal active constituents in the production of the total or composite action of drugs or their preparations. The paper dealt with the chemical classification of the particular resins and also included complete chemical and physical data on the same.

(4) "An Exhibit of Vegetable Drugs Produced during 1917, Medicinal Plant Garden, College of Pharmacy, University of Minnesota," by Prof. E. L. Newcomb.

The exhibit of vegetable drugs more than repaid those who were present at the meeting. Prof. Newcomb's address was a decided stimulus to those who were actively interested in medicinal plant cultivation. The speaker urged all pharmacists to become familiar with correctly prepared drugs and, knowing them, demand them for use in their stores.

CHARLES H. ROGERS,
Secretary.

ST. LOUIS.

On December 28th and 29th, the pharmacists of St. Louis held a mass meeting at the St. Louis College of Pharmacy, for the purpose of discussing ways and means of furthering the interests of the Edmonds Bill (H. R. 5531), creating a pharmaceutical corps in the army. W. C. Bolm was chairman and M. J. Noll secretary of the meeting which became a permanent organization, representing the Alumni Association of the St. Louis College of Pharmacy, the Cinchona Club, the R. D. A. of St. Louis, the St. Louis Branch of the A. Ph. A., the St. Louis Pharmaceutical Society and the St. Louis Drug Club. Special committees were appointed to enlist the interest of the St. Louis Chamber of Commerce, the St. Louis Red Cross, the St. Louis W. O. N. A. R. D., and the St. Louis drug trade in general. A telegram endorsing the Edmonds Bill was sent direct to President Woodrow Wilson. A petition being signed by the drug trade will be forwarded to Samuel L. Hilton, of Washington, chairman of the A. Ph. A. Committee on Status of Pharmacists in the U. S. Service. Arrangements are also being made to have special representatives appear before the committee which has the Edmonds Bill under consideration. Among the speakers were Representatives L. C. Dyer and Joseph Meeker, both heartily endorsing the bill. Professor Francis Hemm, Professor Leo Suppan, C. L. Chittenden, E. A. Sennewald, Carl F. G. Meyer, Dr. W. D. Hoelscher, O. J. Cloughly, J. F. Huesgen and Dr. H. M. Whelpley are among the many who are active in the propaganda.

The central thought of all of the work is to ensure the soldiers as adequate pharmaceutical service as possible. The discussions dwelt upon the deplorable condition existing in many cantonments.

COUNCIL BUSINESS

A. PH. A. COUNCIL LETTER NO. 7.

PHILADELPHIA, November 30, 1917.

To the Members of the Council:

The following budget of appropriations for 1918 is submitted by the Committee on Finance:

Proposed Budget of Appropriations for 1918.

Appropriations for General Expenses:

No. 1 Salaries	$ 6150
No. 2 Printing, Postage and Stationery	1000
No. 3 Clerical Expenses, Secretary's Office	416
No. 4 Miscellaneous Expenses	200
No. 5 Stenographers	350
No. 6 Traveling Expenses	150
No. 7 Committee on Membership	250
No. 8 Committee on Unofficial Standards	100
No. 9 Year Book	3000

No. 10 Premium on Treasurer's Bond	50	
No. 11 National Drug Trades Conference	200	
No. 12 Section on Scientific Papers	25	
No. 13 Section on Education and Legislation	25	
No. 14 Section on Commercial Interests	25	
No. 15 Section on Practical Pharmacy and Dispensing	25	
No. 16 Section on Historical Pharmacy	25	
No. 17 Women's Section	25	
No. 18 National Syllabus Committee	25	
No. 19 Committee on Recipe Book	50	
	$12091	$12091
Appropriations for Open Account:		
No. 20 Journal	$ 6250	
(*a*) Publication	$5000	
(*b*) Clerical Expenses	800	
(*c*) Postage and Stationery	300	
(*d*) Freight, Drayage, Miscellaneous	150	
No. 21 National Formulary	1000	
No. 22 Badges and Bars	50	
No. 23 Certificates	50	
	$7350	7350
		$19441

Do you approve budget of appropriations for 1918 as above proposed? It will be regarded as *Motion No. 14* (*Approval of Budget of Appropriations for 1918*).

J. W. ENGLAND,
415 N. 33RD STREET, PHILA., PA. *Secretary.*

A. PH. A. COUNCIL LETTER NO. 8.

PHILADELPHIA, PA., December 26, 1917.
To the Members of the Council:

Motion No. 7 (*Establishment of special Committee on Research*), *Motion No. 9* (*Nomination of special Committee on Research*), *Motion No. 11* (*Election of Members; applications Nos. 20 to 27 inclusive*), *Motion No. 12* (*Approval of Time of Holding the 66th Annual Convention of the American Pharmaceutical Association*), *Motion No. 13* (*Election of E. N. Gathercoal as Local Secretary for 1918*) and *Motion No. 14* (*Approval of Budget of Appropriations for 1918*) have each received a majority of affirmative votes.

Motion No. 8 (*Selection of special Committee on Research*) and *Motion No. 10* (*Nomination of special Committee on Research*) have both failed of passage.

General Secretary Day writes:

"In the current budget 1916–17, an item of $25.00 is provided for the expenses of the Women's Section. The bills incurred by the Section amount to $53.72. Therefore, I move and Professor Koch seconds an additional appropriation of $28.72 to cover the deficit in this item of the budget."

The above motion will be known as *Motion No. 15* (*Additional Appropriation of $28.72 for Women's Section for 1916–17*).

Motion No. 16 (*Election of Members*). You are requested to vote on the following applications for membership.

No. 28. Russell Newton Loomis, 942 16th St., Boulder, Colo., rec. by F. J. Perusse and Chas. J. Clayton.

No. 29. Agnes Pauline Bechmann, 1075 11th St., Boulder, Colo., rec. by Francis J. Perusse and F. W. Nitardy.

No. 30. Israel Subin, 1800 N. 7th St., Philadelphia, Pa., rec. by E. G. Eberle and J. W. England.

No. 31. William R. Neville, Griffith Drug Co., Scarborough Bldg., Austin, Tex., rec. by H. M. Whelpley and J. C. Falk.

No. 32. Donovan D. Mosher, Wagoner, Okla., rec. by Howard S. Browne and C. V. Nichols.

No. 33. Thomas David Turner, Henning, Tenn., rec. by E. W. Wright and R. L. Crowe.

No. 34. C. LeRoy Wall, 5829 Montrose St., Philadelphia, Pa., rec. by E. G. Eberle and Charles H. LaWall.

No. 35. Edgar B. Sparks, Baptist Memorial Hosp., Memphis, Tenn., rec. by E. W. Wright and R. L. Crowe.

No. 36. Henry B. Waltermann, 5th and Lock, Cincinnati, Ohio, rec. by Chas. A. Apmeyer and C. T. P. Fennel.

No. 37. Herman E. Igler, Glendale, Ohio, rec. by Chas. A. Apmeyer and C. T. P. Fennel.

No. 38. Frank Gannon Ebner, 442 St. Clair Ave., Detroit, Mich., rec. by Ernest Kimmich and Walter M. Chase.

No. 39. Frank Louis Grothe, 1135 Spring St., Cincinnati, Ohio, rec. by Chas. A. Apmeyer and C. T. P. Fennel.

No. 40. J. Harry Bruker, 1908 Cleneay Ave., Norwood, Ohio., rec. by Chas. A. Apmeyer and C. T. P. Fennel.

No. 41. Mrs. Lenore K. Dannettelle, 601 W. 8th St., Cincinnati, Ohio, rec. by Chas. A. Apmeyer and Bertha Ott.

No. 42. Ralph Freiberg, 3501 Reading Road, Cincinnati, Ohio, rec. by Chas. A. Apmeyer and C. T. P. Fennel.

No. 43. Dr. Charles George Foertmeyer, 600 Central Ave., Cincinnati, Ohio, rec. by Chas. A. Apmeyer and C. T. P. Fennel.

No. 44. Fred L. Vilas, Pierre, S. D., rec. by E. G. Eberle and D. F. Jones.

No. 45. Isam M. Light, 6020 Monroe Ave., Chicago, Ill., rec. by Wm. B. Day and E. N. Gathercoal.

No. 46. Mrs. Mabel S. Beavo, 4112 N. Springfield Ave., Chicago, Ill., rec. by Jean Gordon and Wm. Gray.

No. 47. William J. B. Gram, 400 Lake St., Oak Park, Ill., rec. by Wm. B. Day and E. N. Gathercoal.

No. 48. Frank J. Dubsky, 1834 W. 47th St., Chicago, Ill., rec. by Wm. Gray and Wm. B. Day.

No. 49. Robert Buckingham Whitney, 126 Willett St., Jamaica, N. Y., rec. by W. W. Stockberger and A. F. Sievers.

No. 50. George Serrins, 214 Broadway, Cincinnati, Ohio, rec. by Chas. A. Apmeyer and Chas. T. P. Fennel.

No. 51. Albert Schneider, 2nd and Parnassus Ave., San Francisco, Cal., rec. by E. G. Eberle and J. W. England.

No. 52. William Harris Tibbetts, Pearl and Cecunbia St., Union City, Ind., rec. by Wm. B. Day and J. W. England.

No. 53. Salvatore Giorgianni, 2272 Pacific St., Brooklyn, N. Y., rec. by A. Graziani and G. Petillo.

No. 54. James Douglas Yongue, Pickens, S. C., rec. by Henry Plenge and Joseph B. Hyde, Jr.

No. 55. Michael Schuster Heckler, 807 Cherry St., Vicksburg, Miss., rec. by E. J. Kennedy and H. C. Christensen.

No. 56. Robert Jacob Miller, 1800 Green Street, Philadelphia, Pa., rec. by Charles H. LaWall and M. R. LaWall.

No. 57. Willis Cobb Holcomb, U. S. S. Virginia, care of Postmaster, New York, rec. by J. F. Rupert and J. W. England.

No. 58. Arthur P. Gronau, Great Lake Naval Training Sta., Hospital School, Company C., 1, Great Lakes, Ill., rec. by Wm. B. Day and E. N. Gathercoal.

No. 59. Cassius Lovelace Clay, 203 New Court Bldg., Royal St., New Orleans, La., rec. by Philip Asher and Wm. B. Day.

No. 60 Alfred Meade Hirscher, 1807 4th St., S. E., Minneapolis, Minn., rec. by Charles H. Rogers and F. J. Wulling.

No. 61. Victor Honore Purel, 2632 Gov. Nicholls St., New Orleans, La., rec. by Philip Asher and Wm. B. Day.

No. 62. Henry F. Stecker, 4008 Van Buren St., Chicago, Ill., rec. by Wm. Gray and Wm. B. Day.

J. W. ENGLAND,
Secretary.

415 N. 33RD STREET, PHILA., PA.

A. PH. A. COUNCIL LETTER NO. 9.

PHILADELPHIA, PA., January 2, 1918.

To the Members of the Council:

The sad news has been received of the death of Joseph P. Remington, Past President of the American Pharmaceutical Association and Past Chairman of the Council, on Tuesday, January 1, 1918. The funeral services will be held on Friday, January 4, 1918, at 1.00 P.M. at Holy Trinity Church, Nineteenth and Walnut Streets, Philadelphia, Pa.,

J. W. ENGLAND,
Secretary.

415 N. 33RD STREET, PHILA., PA.

A. PH. A. COUNCIL LETTER NO. 10.

PHILADELPHIA, January 17, 1918.

To the Members of the Council:

Motion No. 15 (Additional Appropriation of $28.72 for Women's Section for 1916–7) and *Motion No. 16 (Election of Members; applications Nos. 28 to 62 inclusive)*, have each received a majority of affirmative votes.

In accordance with Motion No. 9 of Council Letter No. 4, Chairman Hopp has appointed Harry V. Arny as chairman of the special

Committee on Research, and the latter writes as follows:

"Your letter announcing my appointment as chairman of the Committee on Research is at hand and I accept the honor.

"As I understand them, the duties of the Committee on Research are two-fold: (*a*) The formulation of rules and regulations as to how awards from the A. Ph. A. Research Fund shall be made; (*b*) the formulation of plans for the encouragement of research.

"In performing the first duty, it is highly desirable that the fiscal agents of the Association be represented on the Committee; in performing the second duty, we should select those whose research work speaks for itself.

"It will be seen that in fulfilling the grave responsibility of selecting associates, I have had this thought in mind, choosing from the Council Committee on the Financial Status of the National Formulary, from the Research Committee of the Scientific Section and from the Research Committee of the Conference of Faculties. I hope my selections will meet with the approval of the Council.

"With this explanation, I designate the following Committee on Research: Harry V. Arny, Chairman (appointed by the chairman of the Council), George M. Beringer, Julius A. Koch, Henry Kraemer, Charles H. LaWall, Edward Kremers, Wilbur L. Scoville, Alviso B Stevens, Frederick B. Power and Henry Milton Whelpley."

The above recommendations for membership of Committee on Research will now be voted upon by the Council. Do you approve the names as recommended? This will be regarded as *Motion No. 17 (Approval of Membership of Committee on Research)*.

Upon the occasion of the funeral of Prof. Joseph P. Remington, on January 4, 1918, flowers were sent in the name of the American Pharmaceutical Association, and the following letter of acknowledgment has been received:

"1832 Pine Street, Philadelphia, Pa.

Dear Mr. England:

Please convey to the American Pharmaceutical Association most sincere thanks for their thoughtfulness in sending the beautiful flowers. They were greatly appreciated.

Very sincerely,

(Signed) ELIZABETH B. REMINGTON."

January fifth, 1918.

Motion No. 18 (Election of Members). You are requested to vote on the following applications for membership:

No. 63. Crosby B. Washburn, 32 Adams Ave. W., Detroit, Mich., rec. by Leonard A. Seltzer and A. Alton Wheeler.

No. 64. Andrew J. Cromer, 32 Adams Ave. W., Detroit, Mich., rec. by Leonard A. Seltzer and A. Alton Wheeler.

No. 65. Silverio A. Tamayo, Bayamo, Oriente Rep. of Cuba, rec. by J. G. Diaz and José P. Alacán.

No. 66. J. Max A. Schneller, 111 Wall St., New York, N. Y., rec. by E. G. Eberle and J. W. England.

No. 67. A. Elsa Schmidt, 814 Madison Ave., Peoria, Ill., rec. by E. H. Wisner and G. D. Timmons.

No. 68. Charles Emmett Bosserman, Newport, Pa., rec. by Charles H. LaWall and Ivor Griffith.

J. W. ENGLAND,
Secretary.

415 N. 33RD ST., PHILA., PA.

COMMITTEE REPORTS

NATIONAL COMMITTEE ON THE PHARMACEUTICAL SYLLABUS.

BULLETIN XVII.

In Bulletin XV, sent out on September 20, the chairman stated that he was working on some general plans for the work of preparing the new edition of the Syllabus, and all members of the committee were requested to send suggestions along this line and to express their opinions on several specific questions relating to the scope of the Syllabus. Replies were received from a few members at once but others asked for time in which to consider the matter. Some of these sent in replies later, and others will find opportunities to present their ideas as the work progresses.

Helpful suggestions were received from several members, and H. H. Rusby submitted a carefully prepared statement of some aspects of the work. Free use of the replies was made in preparing this Bulletin.

War conditions are so disturbing that it is difficult to do routine work and doubly difficult to accomplish an extra task like the preparation of a new edition of the Syllabus. Nevertheless, we shall endeavor to complete the work of revision and to bring out the new edition on time. As the third edition is scheduled to become effective on July 1, 1920, it should appear in advance of that date, and we have less than two years in which to complete the work of revision. It will be greatly to our advantage if the greater part of the work is completed at an early date, leaving only perfecting of details for the later part of the time available.

It has been conceded generally that the first two editions of the Syllabus show great progress towards the ideal which we are striving for, and that the second edition is a great improvement over the first. The duty of the present committee is to bring out an edition which shall nearly approach the ideal. To accomplish this we must retain what is good in the second edition and replace what is defective with new and better material.

The chief difficulty confronting us in preparing the Syllabus arises from the existence of two distinctly different kinds of pharmacy schools in the country. In the cities of the East we have the small number of large independent schools giving the traditional two-year course in pharmacy leading to the degree of Graduate in Pharmacy, which may be followed by a one-year graduate course; while in the West we have the relatively large number of university departments of pharmacy, giving four-year courses leading to a bachelor's degree. The briefer course is almost purely technical and is the one for which the Syllabus is prepared. The university course, presumably, should contain all that comprises the briefer course with the addition of cultural and other subjects that would justify the granting of the bachelor's degree at its completion.

Dr. Rusby submits the following pertinent questions along this and similar lines:

1. Is the new edition of the Syllabus to be so framed that it will suffice, with mere modifications, for the period when high school graduation is required for admission, or is it to be prepared expressly for the two-year high school period and radically changed thereafter? The treatment of the subject must be different in the two cases, especially as to the earlier portions.

2. Are we to continue to include in the several subjects the present recognized excess of material, knowing, and all agreeing, that it can not all be taught in the time? If not, what is to be the basis of elimination?

3. Is the Syllabus to be framed exclusively for a course of preparation for the board examination, to prepare for the ordinary clerkship in a pharmacy, being thus complete in itself, but unsuited as the first part of a more extended course? Or, is it to take cognizance of the baccalaureate course and degree of university schools, and to serve for the first year's work of such a course, and at the same time serve for the minimum course for board preparation? This is a very serious question for the committee, for the basic character of its Syllabus must depend upon the answer.

4. Is it practicable to construct a Syllabus for a three-year course that will make a proper basis for a fourth year for the B.S. degree, especially if it be followed by work for the D.Sc. degree? Can an alternative arrangement be provided by which the university schools can be permitted to employ a modification of the three-year Syllabus so that it can serve for their first three years?

5. It goes without saying that the views of all represented should be sought as to the present division of time, inclusion and omission of matter and other general subjects.

With the object of making progress with the work, the chairman will make tentative rulings on these questions, subject to revision later as found to be necessary.

1. The present minimum requirement for entrance to schools of pharmacy which are members of the Conference of Pharmaceutical Faculties is the completion of two years of a high school course, or its equivalent. This requirement has only just gone into effect and high school graduation will not be required for entrance before 1923. It seems, therefore, that the next edition of the Syllabus, probably to be effective from 1920 to 1925, should be based upon the entrance requirements of two years of a high school course, and it is so ruled.

2. While the minimum requirement is 600 hours of instruction for each of the two years of the regular course in pharmacy, it is a fact that the majority of the recognized schools give much more time than this. Therefore, it would seem to be best to retain the present general scope of the Syllabus, but that a strong effort should be made to give proportional treatment to the different subjects which are included. This matter will need more consideration later.

3 and 4. Considering all things, it appears that we can only continue our custom and prepare a Syllabus for the purely technical briefer course in pharmacy with possibly a graduate year of work along advanced lines. The cultural work done in the university schools as a part of four-year courses is elective in great part and it properly varies so much that it would not be feasible for us to limit it in the Syllabus in any way. If we bring out an acceptable edition of the Syllabus it should serve all schools of pharmacy, but in different ways, which must be kept in mind during the work of revision. While prepared as a basis for the courses in the independent schools of pharmacy, it should also be the basis of the pharmaceutical courses in the university schools, these pharmaceutical courses to be supplemented by cultural courses sufficient to satisfy the requirements for the bachelor's degree.

5. At the Indianapolis meeting of the committee, it was decided to secure suggestions and constructive criticism of our work from as many of those who are interested as is possible. The chairman fully appreciates the importance of such help and we should secure it in every possible way, but it must be done in such a way as to allow us to finish our work in time. We can get the help we desire, without undue delay, in at least three ways. First, by considering the criticisms of the present edition of the Syllabus; second, by correspondence with interested persons, and third, by suitable publicity concerning our work as it progresses, which will lead to more criticism, some of which will be helpful.

The most important criticisms of the previous editions of the Syllabus have pointed out that the book has many inconsistencies of treatment and is poorly proportioned, particularly that some relatively unimportant subjects received treatment far beyond what they deserve, also that certain parts of the work have treated the subjects as a text-book or compend should do and not like a Syllabus which should give lists of topics to be included in the various courses, and not develop these topics. These are valid objections and should be kept in mind during all the work of revision. Later we shall provide for editing the revised portions to make them conform as nearly as possible to a standardized method of treatment.

The chairmen of the sub-committees are requested to proceed at once with the revisions of their sections of the work and to transmit the revised separate subjects for distribution as fast as the sub-committees are agreed upon them. In preparing the second edition we found it well to assign different subjects to different members for revision, thus distributing the work. After revision, the part was submitted to the chairmen of the sub-committees for further revision if necessary. Then they were transmitted to the chairman of the whole committee for distribution and final revision before adoption. It is suggested that this method be used as far as practicable.

Nothing has been said in this Bulletin about the proposed Syllabus for the year of graduate work. This is quite different from the matters discussed here, and it will be made the basis for a separate Bulletin.

Respectfully submitted,

THEODORE J. BRADLEY, *Chairman.*

PROCEEDINGS OF AN ANNUAL MEETING OF THE NATIONAL DRUG TRADE CONFERENCE HELD AT THE HOTEL EMERSON, BALTIMORE, JANUARY 4, 1918, IN PURSUANCE OF A CALL OF THE PRESIDENT UPON THE WRITTEN REQUEST OF FIVE DELEGATES.

MORNING SESSION.

The meeting was called to order by President John C. Wallace at 10.30 A.M.

The roll being called the following persons answered:

Representing the American Pharmaceutical Association:—John C. Wallace and James H. Beal. (Samuel L. Hilton, absent, had written and approved holding the meeting at Baltimore.)

Representing the National Wholesale Druggists' Association:—Charles A. West, George W. Lattimer and W. L. Crounse, alternate for C. Mahlon Kline.

Representing the National Association of Retail Druggists:—Samuel C. Henry, James F. Finneran and Eugene C. Brokmeyer.

Representing the American Association of Pharmaceutical Chemists:—George C. Hall, W. C. Abbott and J. H. Foy, alternate for B. L. Maltbie.

Representing the American Drug Manufacturers' Association:—Adolph G. Rosengarten, Charles M. Woodruff and A. R. L. Dohme.

Representing the Proprietary Association of America:—Fred K. Fernald, Philip L. Heuisler and Frank A. Blair, alternate for Harry B. Thompson.

C. M. Woodruff moved the adoption of the following resolution:

WHEREAS, unexpected conditions respecting hotel accommodations have made it impossible to hold an annual meeting at Washington this year, therefore be it

Resolved, that the Code of Rules and Regulations requiring this meeting to be held at Washington be suspended by unanimous consent, and that this meeting be hereby declared as regular in every respect as if it had been held in Washington.

Motion duly seconded and carried unanimously.

The minutes of the meeting held April 30, 1917, were read and approved.

The privileges of the floor were duly extended to Charles J. Lynn, president, and W. J. Woodruff, secretary of the American Drug Manufacturers' Association; also to R. C. Stofer of the Norwich Pharmacal Company and Mr. Beardsley of the Proprietary Association of America.

The President made a statement that an annual meeting had been first called for January 7 and 8, and the dates had been advanced to the third and fourth upon the telegraphic request of five delegates. The Secretary supplemented the statement by reporting that within six working hours after he had received the President's first call he had notices to all delegates in the mails; further, that he had notices of the change in dates in the mails within four working hours after he received the telegraphic notice from the President.

The following report of the Executive Committee was then read, duly ordered received and laid over for action later:

REPORT OF THE EXECUTIVE COMMITTEE.

TO THE MEMBERS OF THE NATIONAL DRUG TRADE CONFERENCE:

The Executive Committee of the National Drug Trade Conference begs leave to report that a meeting was held at Room 323 in the Hotel Emerson, Baltimore, Thursday afternoon, January 3, 1918, at which were present all the members of the Committee.

The meeting having been called to order by President Wallace, J. H. Beal moved that any requirement that the Executive Committee should meet at Washington be waived in consideration of the condition with respect to hotel accommodations.

Motion seconded and unanimously adopted.

The minutes of the meeting of the Conference held at Washington, April 30, 1917, were read and the adoption of the same was recommended to the Conference.

The resolutions recommended to the Conference by the joint conference on the subject "The Habit-Forming Narcotic Drug Evil," held May 1 and 2, 1917, were referred to J. H. Beal, A. R. L. Dohme and J. F. Finneran for revision and ordered to be submitted to the Conference for action when so revised.

The Secretary-Treasurer then read the following report:

NATIONAL DRUG TRADE CONFERENCE.

FINANCIAL STATEMENT OF DATE JANUARY 1, 1918.

RECEIPTS.

January	15, 1917, On hand as per report	$410.38
January	26, 1917, Received from N. W. D. A	50.00
January	26, 1917, Received from P. A. A	50.00
February	5, 1917, Received from A. A. Ph. C	50.00
March	16, 1917, Received from A. D. M. A	50.00
June	11, 1917, Received from A. Ph. A	50.00
May	7, 1917, Received from N. A. R. D	50.00
		$ 710.38

DISBURSEMENTS.

Check 23, Jan. 20, 1917:		
Paid stenographer for copying minutes of meeting	5.40	
Check 24, Feb. 20, 1917:		
Postage stamps	3.00	
Check 25, March 1917:		
R. S. and A. B. Lacey, opinion in aspirin matter	150.00	
Check 26, March 20, 1917:		
Paid for printing the opinion in the aspirin matter	10.30	
Check 27, March 21, 1917:		
Dues U. S. Chamber of Commerce	10.00	
Check 28, April 5, 1917:		
Paid for printing revised list of members, and rules, etc	5.10	
Check 29, April 6, 1917:		
Stamps and telegrams to date	4.90	
Check 30, April 9, 1917:		
Paid for 100 copies Free Press containing article on Narcotic Conference	2.00	
Check 31, June 11, 1917:		
Paid Shorthand Reporting Co. for reporting Narcotic Meeting	143.50	
Check 32, December 15, 1917:		
Postage stamps to date	3.00	337.20
Balance on hand January 1, 1918		$ 373.18

There are still bills for telegrams and for mimeographing unpaid that have not yet been rendered. These will not amount to ten dollars.

Respectfully submitted,

CHARLES M. WOODRUFF,
Secretary-Treasurer.

James F. Finneran moved that the Executive Committee recommend that the Conference make the usual assessment of $50 upon each constituent organization member for the year 1918.

Seconded, put to vote and adopted.

James F. Finneran moved that the Executive Committee recommend that the Conference adopt a resolution providing that the expenses of any officer or delegate assigned to any special duty in the interval between regular meetings shall be paid from the funds of the Conference.

Seconded, put to vote and carried.

A communication from the National Pharmaceutical Service Association was then read, asking that the Conference endorse the Edmonds Bill which provides for a pharmaceutical corps in the army, and also that the Association be invited to become a member of the Conference. After considerable discussion the communication was referred to the Conference with the recommendation that the Conference endorse the general proposition to create a pharmaceutical corps in the United States Army.

F. K. Fernald moved that Samuel C. Henry be requested to invite a representative of the National Pharmaceutical Service Association to address the Conference upon the subject of the communication.

Motion seconded, put to vote and carried.

J. H. Beal moved that the Executive Committee recommend that the Conference stand adjourned for a period of two hours from one o'clock, Friday, January 4, 1918, out of respect to the memory of the late Professor Joseph Price Remington, of Philadelphia, Pa., whose useful life and eminent services to pharmacy have been of vast and continuing value to the manufacturing, chemical and pharmaceutical industries, and to every division of the entire drug trade.

A chorus of seconds greeted the motion and it was put to vote and carried unanimously.

President John C. Wallace was then duly authorized and instructed to telegraph Adolph G. Rosengarten, of Philadelphia, to attend the funeral of the late Professsor Joseph P. Remington as the representative of the Conference, or, if impossible to attend, to select someone to act in his stead.

J. H. Beal moved that a committee of three be appointed by the chairman of the Executive Committee to frame resolutions on the life and services of the late Joseph P. Remington, and report same to the afternoon session of the Conference on January 4, 1918.

Motion seconded, put to vote and adopted.

The Chairman then appointed Messrs. A. R. L. Dohme, Samuel C. Henry and R. C. Stofer as such committee.

The Committee then adjourned to meet at the call of the Chairman.

JOHN C. WALLACE,
Chairman.

CHARLES M. WOODRUFF,
Secretary.

The Committee appointed April 30, 1917, to ascertain whether the organization members were willing that the Code of Rules and Regulations be amended so as to give the Conference power of action respecting motions and resolutions adopted unanimously by the Conference, without first securing the approval of each constituent organization as now required by such Code, submitted the following report:

REPORT OF THE COMMITTEE TO SECURE GREATER POWERS FOR THIS CONFERENCE.

GENTLEMEN OF THE NATIONAL DRUG TRADE CONFERENCE:

Your committee appointed to attend the several national associations which are members of this Conference regret to state that they have been unable to complete their work up to this time. They have presented this question to several of these associations, however, and can report that in cases of the N. A. R. D. and the A. Ph. A. there is distinct willingness to transfer to their delegates the necessary powers to act subject to the confirmation by their executive committee or Council in case of the N. A. R. D. and freedom to act alone in case of A. Ph. A.

We were unable to get to the other association meetings and will have to ask that the committee be continued to secure similar action on the part of the remaining association members.

Respectfully submitted,
DR. A. R. L. DOHME,
JAMES F. FINNERAN,
CHARLES A. WEST,
Committee.

Report received and committee continued.

The committee appointed April 30, 1917, to secure recognition for pharmacy on the Advisory Board of the Council of National Defense then submitted the following report which was received and laid over for later discussion:

REPORT OF COMMITTEE TO SECURE OFFICIAL RECOGNITION ON THE NATIONAL COUNCIL OF DEFENSE.

TO THE PRESIDENT AND MEMBERS OF THE NATIONAL DRUG TRADE CONFERENCE:

Your committee upon this important subject, concerned as its activities must necessarily be with the winning of the war by endeavoring to convince the Federal Government that the coöperation and advice of an experienced expert from the drug trade would save the Government both money and time and at the same time secure better results, undertook its mission soon after it was appointed. It was however unsuccessful in securing either a hearing or recognition at that time, being told that such matters had been provided for in the Government's usual routine and methods, in which no change could be made.

Your committee ventures the assertion that until the drug trade shall present to the Government, the press and the people as united a front and as well organized and managed an association as does medicine, it can not hope to secure what it wants or what its importance and service entitles it to have. It takes this opportunity to lay before you the experience which six of your delegates had at the War Service Committee Conference, called together by the U. S. Chamber of Commerce on December 12, 1917, at Washington, at the instigation of and under the protection of the National Council of Defense. The history of the War Service Drug Committee, appointed by a conference of manufacturers last spring and called as the result of the Government's experience in failing to have a practical drug man upon its Council of Defense, is well known to you and need not be detailed here. There is no such committee now and the Government has need for and is urgently calling, as I shall show in the discussion to follow, for the appointment of such a War Service Drug Committee by the united drug industries of this country.

The six delegates representing six national associations composing this Conference were present on December 12, at Washington, each a chairman of a war service committee named by his association. They came with the expectation to act separately as six committees. They found that the meeting resolved through a committee named by it that wherever possible a single committee should represent an industry. They held a meeting, suggested by Messrs. Ohliger and Blair, and asked the chairmen of this Committee to attend. They concluded unanimously that this N. D. T. C. met all the requirements of the resolutions passed by the meeting and determined to register this Conference with the notation upon the registration card that its war service committee would be appointed later. They further instructed your chairman of this Conference to call a meeting of the Conference at the earliest possible moment which he did by wire the following morning, also notifying the secretary of this Conference at the same time by wire. This meeting was to be for the purpose of appointing this War Service Drug Committee. Your committee feels that it is their duty, being appointed to secure official recognition of this Conference by the National Council of Defense, to report to-day that the Government is in urgent need of a united representative war service committee representing the active and united drug trade. Urgency is becoming more acute every day since it is becoming apparent that we must supply many more men and at a quicker rate than we had expected to do and it is our duty as patriotic citizens, willing and anxious to do all we can to help win the war, to name this War Service Committee at this meeting. We further believe this committee should have at least one representative of each association, member of this Conference, upon it, and of the manufacturing member association several, also C. L. Huisking as representative of the drug brokers. We think, finally, that this committee should be geographically centralized, if possible, as suggested by the resolutions and should meet at least once a week and devote much if not all of their time to the country's service and that it should have a chairman and a secretary and a stenographer.

Respectfully submitted,

DR. A. R. L. DOHME
EUGENE C. BROKMEYER,
SAMUEL L. HILTON,
Committee.

The Special Committee on the Interpretation and Enforcement of Food and Drug Laws then submitted the following final report which was duly accepted and approved, and the committee discharged.

REPORT OF THE SPECIAL COMMITTEE ON INTERPRETATION AND ENFORCEMENT OF THE FOOD AND DRUG LAWS APPOINTED IN PURSUANCE OF A RESOLUTION PASSED AT A REGULAR MEETING OF THE NATIONAL DRUG TRADE CONFERENCE HELD DECEMBER 16, 1915.

TO THE OFFICERS AND MEMBERS OF THE NATIONAL DRUG TRADE CONFERENCE:

Your Committee, appointed in pursuance of the action taken at the regular meeting of the Conference, held December 16, 1915, and known as the Special Committee on Interpretation and Enforcement of the Food and Drug Laws, begs leave to submit its final report.

Rumors of malfeasance on the part of subordinates in both Federal and State employ

continue to reach our ears, but always indirect or with reservations that make what information is vouchsafed unavailable. For example, it is again reported that an inspector in an eastern state is carrying a side line that he directs to the attention of the retailer as soon as he has finished his inspection and before he has informed his prospect of his findings.

The Chairman of the Committee might give the name and address of a state food and drug commissioner who frankly acknowledged that his adverse report upon one preparation he had condemned had been based upon a misreading of the label which upon a more careful examination was found to state that the pill contained 1–240 grain instead of 1–24; but before the mistake was discovered the dealer had been informed that the pill was substandard, and had resolved to patronize the particular manufacturer concerned no longer.

One evil exists to which attention should be directed. It is inherent in the power which the law gives to administrative bodies to dictate what therapeutic claims may be made for certain drugs and what may not, and to force the opinion of a faction in power upon manufacturers, whatever contrary and equally trustworthy views may prevail.

It is easy for the Government to find experts who will go upon the witness stand and testify that almost any therapeutic statement that may be made is false. In 1877 to 1880 such experts would have sworn that Cascara Sagrada was a fake; in 1894 that diphtheria antitoxin was fraudulent and would not cure diphtheria.

Such testimony under present procedure can only be combated by other expert testimony at enormous expense, even to prove the simplest proposition. The defendant may have hundreds of favorable reports from the most authentic sources; but they will not be admitted even to prove the lack of that intent to defraud which the United States Supreme Court has said is essential to constitute a violation of the Shirley amendment.

The result of this condition is that manufacturers plead guilty when they are not guilty, to save expense; pharmaceutical progress is prejudiced and medicine confined to the bounds by opinionated theorists who regard the practical experience of liberal physicians as unworthy of credit.

If such a condition had existed a century ago medicine and pharmacy would be to-day where they were then.

This weight should be lifted in the interests of justice and progress; but it will not be until our newspapers appreciate the situation and arouse a public sentiment that will drive medical bigotry and intolerance to the rear, in the interest of the very public health of which these doctrinaires assume to be the guardians.

However, your committee was created to afford a medium through which well-founded specific complaints, especially of retailers who are not so able to care for themselves as wholesalers and manufacturers, might reach the fountainhead, and proper redress be afforded. The existence of the committee has been known to the whole industry and trade for two years, although it has been given no work to do; wherefore it begs leave to submit this as its final report and to ask that it be honorably discharged.

C. M. WOODRUFF,
JAMES H. BEAL,
GEORGE W. LATTIMER,
R. C. STOFER,
SAMUEL C. HENRY,
Committee.

George C. Hall moved that the Conference continue its affiliation with the United States Chamber of Commerce during the ensuing year.

Motion seconded by James F. Finneran, put to vote and carried.

The Conference then took up the recommendations of the Executive Committee and respecting the first one, R. C. Stofer moved that a committee of five be appointed to frame resolutions on the late Professor Joseph P. Remington, and that Messrs. A. R. L. Dohme, Samuel C. Henry, R. C. Stofer, John C. Wallace and Frank E. Holliday constitute such committee.

Motion duly seconded and carried.

The resolutions recommended by the joint conference held at Washington, May 30, 1917, under the auspices of the National Drug Trade Conference, as revised by the committee appointed by the Executive Committee for that purpose were read seriatim and adopted as follows:

REPORT OF THE COMMITTEE ON RESOLUTIONS.

J. H. BEAL: Mr. President and Gentlemen, the Committee on Resolutions recommends that the joint convention of members of the National Drug Trade Conference and of delegates from municipal and state governments, and the various organizations and societies existing for the purpose of controlling crime and the evils resulting from the misuse of habit-forming narcotic drugs, and of representatives of various Federal departments, recommend to the National Drug Trade Conference the adoption of the following resolutions:

1. That the results of public and private investigation very clearly indicate that there has been a large decrease in the distribution of habit-forming narcotic drugs through the regular drug trade channels since the enactment of the Federal Anti-Narcotic Law, commonly known as "The Harrison Law," and that the principal proportion of such drugs now supplied to addicts and to the under-world comes through unregistered dealers operating in defiance of law, whose supplies are very largely obtained by theft and burglary and through the operations of smugglers.

2. That, whereas investigation clearly proves that large quantities of habit-forming narcotic drugs are smuggled into the United States, and form one of the principal sources of supply of drug addicts and of the under-world, materially increased precautions against smuggling will have to be taken, before the supply of such drugs to illegitimate distributers can be successfully controlled.

3. Since investigation indicates that a considerable proportion of the supply of habit-forming narcotic drugs in the hands of illegitimate distributers has been obtained through theft and burglary while in storage *or in transit*, and since the number of such thefts and burglaries is constantly increasing, the National Drug Trade Conference earnestly advises and urges all members *of the medical professions and of the drug trade* to a fixed policy of preserving their stock of such drugs in securely locked compartments, vaults, or burglar-proof safes, and under such precautions as will effectually prevent access thereto only by trustworthy and properly authorized employees.

4. That the market for habit-forming narcotic drugs handled by unregistered dealers in defiance of law and obtained by theft, burglary, or smuggling, or other illegal source of supply, is very largely created and sustained by the difficulty of addicts in obtaining such drugs through the normal channels of trade, and who, in their desperation, are ready to pay enormous prices for such drugs.

5. That it is the opinion of experts, who have carefully investigated the subject, that no amount of legislation, either state or federal, will effectually suppress the traffic in habit-forming narcotic drugs by unregistered and surreptitious dealers, until proper and sufficient provisions have been made for the care and treatment of existing drug addicts, whose purchases sustain the secret markets for such drugs.

6. That investigation shows it to be essential to the suppression of the evils due to the misuse of habit-forming narcotic drugs, that provision should be made for the treatment of existing drug addicts in municipal, state, or federal sanatoria, or in private sanatoria, under strict public supervision and control.

7. That investigation has developed the fact that numerous so-called "institutions" for the treatment of drug addicts, under private control, are, in fact, conducted for the profit to be obtained through the supply of the drugs to addicts, or for the exploitation of the addict, and that the methods of treatment used therein are calculated to perpetuate, rather than to cure, drug addiction.

8. That in consequence of the foregoing established facts, all privately conducted sanatoria for the treatment of drug addiction should be subject to strict supervision and control by the public authorities entrusted with the enforcement of anti-narcotic laws.

9. That in order to make state anti-narcotic laws capable of effective enforcement, every such law should contain provisions making it an offense to have possession of habit-forming narcotic drugs, unless satisfactorily explained, and also making simple proof of possession of such drugs *prima facie* evidence of violation of the law.

10. That the furnishing of addicts, not under restraint and responsible control, with habit-forming narcotic drugs, to be self-administered by such addicts as a part of the treatment for the cure of drug addiction, is contrary to public policy and should be prohibited in all cases.

11. That there is great need for the further study of the problem of drug addiction and of the treatment of drug addicts, and that publications especially addressed to the members of the drug trade and to the medical professions are requested to use their best efforts for the collection and dissemination of authoritative and reliable information concerning action of the so-called habit-forming narcotic drugs and the action and reaction of such drugs on addiction patients.

12. That state anti-narcotic laws should contain provision for the revocation of the license of physicians, pharmacists, or other licensed persons, convicted of the wilful violation of the anti-narcotic laws.

13. That the possession of hypodermic syringes or needles by drug addicts should be an offense under the law, and proof of the possession of such instruments by such addicts should render them subject to arrest and restraint.

The Secretary-Treasurer's report was then approved.

The recommendation of the Executive Committee that the usual assessment of $50.00 upon each organization member be made for the ensuing year was duly approved and the assessment ordered.

The recommendation of the Executive Committee that the expenses of any officer or delegate assigned to any special duty in the interval between regular meetings be paid from the funds of the Conference was duly approved, and it was so duly ordered.

The communication from the National Pharmaceutical Service Association was received, and the recommendation of the Executive Committee referred back for further consideration.

The recommendation of the Executive Committee that the Conference stand adjourned from one o'clock for two hours in respect to the memory of the late Professor Joseph Price Remington was unanimously approved and adopted by a standing vote.

A. R. L. Dohme stated that he had arranged to have flowers sent to the home of the late Professor Remington on behalf of the Conference and his action was unanimously confirmed.

The following report of the special committee on Delayed Importations was then submitted, approved of and the Committee continued:

REPORT OF COMMITTEE UPON DELAYED IMPORTATIONS.

TO THE PRESIDENT AND MEMBERS OF THE NATIONAL DRUG TRADE CONFERENCE:

While this report is not strictly the report of a committee of this Conference, it does represent the Conference as well as the N. W. D. A. at a hearing of the Bureau of Chemistry at Washington on March 25, 1917, called by Dr. Carl L. Alsberg. It was deemed by the secretary of the Conference, since it appeared desirable, at a meeting held on the evening preceding the hearing at the Willard Hotel, that it would better serve the purpose as a N. D. T. C. committee, than as a N. W. D. A. committee.

Your chairman, therefore, feels it desirable to report the result of the hearing. Briefly stated it was that publicity of articles and importers suffering from delay by not being up to standard should not be had. Further, that greater uniformity in methods and standards for admitting drugs should be had at the several ports of entry of this country. Further, that publicity of methods of assay and tentative standards of unofficial drugs should be had, so that importers might advise their correspondents abroad as to what requirements their next shipments of goods should meet. Finally, that the Conference for the drug trade desired a full coöperation between the Bureau and itself to the end that before any new tentative standard or assay or test was adopted, it be referred to the Conference committee consisting of Messrs. C. Mahlon Kline, I. McKesson and A. R. L. Dohme for criticism and change or approval.

Dr. Alsberg agreed to all these suggestions, except the last coöperation suggestion, which he said appealed to him very much, and which he would take under advisement.

At a meeting and dinner of the Baltimore Drug Exchange, which Dr. Alsberg attended as invited guest of honor, he publicly announced that he had favorably considered the cooperation suggestion of the N. D. T. C. committee. Shortly afterwards we acted upon this suggestion and submitted to your committee proposed tentative standards for dandelion root, aletris root and cramp bark (*Viburnum opulus*). Your committee promptly took up the three tentative standards and studied them in the light of their laboratory experience and

records, and reported back their criticism, data and findings. Among these was the finding that cramp bark should be in future as it had been for 20 years or more *Acer spicatum* or mountain maple bark, whereas the Bureau had concluded to permit the use of the common name—Cramp Bark—solely for true *Viburnum opulus* or high cranberry bark.

In the next number of the *Service and Regulatory Announcements*, the official bulletin of the Bureau, there appeared the adopted tentative standards of these three drugs. From this it appears that our suggested changes in dandelion root and aletris root had been adopted, but that cramp bark had to change its 20 years of *Acer spicatum* for *Viburnum opulus*. This was in April or May 1917. Since that time nothing has been heard from the Bureau of Chemistry in the coöperation line by your committee nor did a subsequent effort of your committee to permit cramp bark to continue to be *Acer spicatum* as the U. S. P. VIII described it to be under the name of *Viburnum opulus* with synonym, Cramp Bark, produce any result.

Your committee feels that it might be considered officious by the Bureau for it to knock at its door for more coöperation work, and has hence not heard anything since last summer from the Bureau.

Your committee asks to be continued so that when further suggestions come it may be in a position to promptly reply.

Respectfully submitted,

A. R. L. DOHME,
Chairman.

Mr. Woodruff then gave notice that at the next session of the Conference he would move to amend the first paragraph of Section 4 of the Code of Rules and Regulations so as to read:

Section 4: Meetings—The Conference shall hold one regular annual meeting at a time and place to be designated by the president, and such additional meetings as may be provided for.

The report of the special committee to secure recognition of pharmacy on the Advisory Board of the Council of National Defense was then taken up and discussed by A. R. L. Dohme.

Inquiry disclosed that each constituent organization had its own war service committee.

J. H. Beal then moved the adoption of the following as the sense of the Conference, which motion was duly seconded:

REPRESENTATION ON WAR SERVICE COMMITTEE.

1st. That each of the several constituent associations, members of the National Drug Trade Conference, should appoint its own war service committee to confer with the War Committee of the Chamber of Commerce of the United States, and with the war authorities of the United States Government, in the consideration of matters or questions affecting the particular divisions of the drug trade or drug manufacturing industries which such constituent associations respectively represent.

2nd. That the National Drug Trade Conference suggests the formation of a joint committee composed of an equal number of members from each of the above-proposed war service committees to consider and report upon matters and questions in which the several divisions of the drug trade or drug manufacturing divisions possess a joint or common interest.

3rd. That in so far as it may be proper and consistent for it to act, the National Drug Trade Conference will coöperate with and assist the several war service committees and the above-suggested joint committee in the discharge of their respective duties in representing the various divisions of the drug trade and drug manufacturing industries.

On motion consideration of the motion was laid over until the afternoon session.

President Wallace then appointed the following nominating committee: Messrs. Rosengarten, Henry, Lattimer, Beal, Hall and Fernald.

The hour of one having arrived the Conference adjourned until three o'clock out of respect to the memory of the late Professor Joseph P. Remington.

AFTERNOON SESSION.

The Conference reconvened for the afternoon session at 3.30, all delegates being present.

President John C. Wallace called the meeting to order.

Secretary C. M. Woodruff moved that the motion of J. H. Beal be amended by striking out all of the second paragraph, making the third paragraph read "2nd," and eliminating the words "and the above-suggested joint committee" from the last paragraph.

The motion was seconded, put to vote and carried.

The motion, as thus amended, was put to vote and carried, and now reads:

1st. That each of the several constituent associations, members of the National Drug Trade Conference, should appoint its own war service committee to confer with the War Committee of the Chamber of Commerce of the United States, and with the war authorities of the United States Government, in the consideration of matters or questions affecting the particular divisions of the drug trade or drug manufacturing industries which such constituent associations respectively represent.

2nd. That in so far as it may be proper and consistent for it to act, the National Drug Trade Conference will coöperate with and assist the several war service committees in the discharge of their respective duties in representing the various divisions of the drug trade and drug manufacturing industries.

The committee appointed to frame suitable resolutions relating to Professor Remington then submitted the following report:

JOSEPH PRICE REMINGTON.

WHEREAS, in his wisdom it has pleased Almighty God to take from our midst our distinguished and highly esteemed friend and fellow pharmacist, Joseph Price Remington, and

WHEREAS, the services which Joseph Price Remington has rendered the people of this entire country, the profession of pharmacy, the entire drug trade and the many thousands of young men who have enjoyed the privilege of being his pupils have been of unusual prominence, extent and excellence, and

WHEREAS, the Revision Committee of the U. S. P. has been especially benefited and assisted by his eminent qualitites as leader and chairman during a period of over twenty-five years, and the American Pharmaceutical Association has enjoyed his wise counsel and sincere help and support as member, counselor and president and

WHEREAS, the International Pharmaceutical Congress has for many years enjoyed the advantage and benefit of his varied experience and advice and

WHEREAS, all the many interests and branches of pharmacy and the drug trade have by his demise suffered a great and irreparable loss, and his many thousands of friends in this country and abroad have lost and will sadly miss that ever-present and always encouraging smile and pleasant word which was so characteristic of Prof. Remington and has smoothed over so many "rough" and "stony" spots in the life and career of his pupils and friends and

WHEREAS, it seems incredible and difficult to conceive that his many friends, associates and pupils will never in this life again see the genial countenance and grasp the warm friendly hand of our departed friend, now be it therefore

Resolved, by the National Drug Trade Conference in meeting assembled on this the day on which his mortal remains shall be transferred to their last resting place in the "city of brotherly love" in which he has spent practically all his many useful happy years, that in his death pharmacy, and the drug trade and this Conference have lost one of their most prominent and distinguished representatives and friends, and be it further

Resolved, that this National Drug Trade Conference hereby gives expression to its feeling of sorrow at the loss it has sustained through his death and of sympathy with his family in their great bereavement and be it further

Resolved, that a copy of these resolutions be spread upon the minutes of this Conference and as well that a copy be sent to the family of our deceased friend and to the pharmaceutical press.

Respectfully submitted,

A. R. L. DOHME, *Chairman*,
SAMUEL C. HENRY,
R. C. STOFER,
JOHN C. WALLACE,
FRANK E. HOLLIDAY.

The Executive Committee reported back the following resolution which was duly adopted:

Resolved, that the National Drug Trade Conference, not intending to approve any bill or measure it has not deliberated upon, endorses the creation of a pharmaceutical corps in the United States Army.

The motion to amend the Code of Rules and Regulations, notice of which was given at the morning session, was taken up and unanimously adopted.

The first paragraph of Section 4 of the Code of Rules and Regulations will therefore read as follows:

Section 4: Meetings—The Conference shall hold one regular annual meeting at a time and place to be designated by the president, and such additional meetings as may be provided for.

ELECTION OF OFFICERS AND EXECUTIVE COMMITTEE.

The following officers and members of the Executive Committee were then nominated and elected in accordance with the Code of Rules and Regulations to serve during the ensuing year:

President, James H. Beal of Urbana, Ill.

First Vice-President, Samuel C. Henry of Chicago, Ill.

Second Vice-President, Dr. Wallace C. Abbott of Chicago, Ill.

Third Vice-President, C. Mahlon Kline, of Philadelphia.

Secretary-Treasurer, Charles M. Woodruff of Detroit, Mich.

Members of Executive Committee to act with the President and Secretary: John C. Wallace of New Castle, Pa, James F. Finneran of Boston, Mass., Dr. W. C. Abbott, of Chicago, Ill., Fred K. Fernald of Elkhart, Ind., Dr. A. R. L. Dohme of Baltimore, Md., George W. Lattimer of Columbus, Ohio.

Delegate and Councillor to C. C. of U. S. A., Samuel L. Hilton, of Washington.

President James H. Beal then moved that the Executive Committee be authorized to fill any vacancies that may occur during the year.

Motion seconded and adopted.

There being no further business the Conference adjourned to meet upon call as provided by the Code of Rules and Regulations.

JAMES H. BEAL, *President*.

CHARLES M. WOODRUFF, *Secretary*.

UNITED STATES PUBLIC HEALTH SERVICE.

List of changes of duties and stations of commissioned and other officers of the United States Public Health Service for the seven days ended January 16, 1918.

Pharmacist Charles Slough. Relieved at Chicago, Ill. Proceed to Marine Hospital, Mobile, Alabama. Dec. 31, 1917.

Pharmacist B. E. Holsendorf. Bureau letter dated Nov. 28, 1917. Amended to read "Report immediately to Bureau for temporary duty." Jan. 3, 1918.

Pharmacist C. G. Carlton. Relieved at Lexington, Ky. Proceed to Marine Hospital, Chicago, Ill. Dec. 31, 1917.

Pharmacist Louis W. Ryder. Relieved at Marine Hospital, Mobile, Ala. Proceed to Lexington, Ky., for duty. Dec. 31, 1917.

Sanitary Engr. L. C. Frank. Proceed to Gulfport, Miss., and other places in the vicinity for studies of malaria. Dec. 29, 1917.

Sanitary Engr. H. R. Crohurst. Proceed to Augusta, Ga., to investigate water supply system. Dec. 31, 1917.

Sanitary Inspector W. Purrington. Proceed to Greenville, S. C., for consultation on milk situation. Jan. 3, 1918.

Scientific Asst. A. F. Allen. Relieved at Anniston, Ala. Proceed to Hattiesburg, Miss., on special temporary duty. Jan. 3, 1918.

Prof. Carl Voegtlin. Proceed to Philadelphia, Pa., and New York, N. Y., for the inspection of establishments licensed for the manufacture of Araphenamine. Jan. 15, 1918.

Sanitary Engr. L. C. Frank. Proceed to New Orleans, La., and other places in the Southern States for the conduct of malaria studies. Jan. 11, 1918.

Special Expert W. C. Purdy. Proceed to Lonoke, Ark., for duty in connection with malaria investigations. Jan, 5, 1918.

Sanitary Bacteriologist E. J. Thoriault. Relieved at Cincinnati, O. Report to Director, Hygienic Laboratory, for duty in studies of industrial hygiene. Jan. 7, 1918.

Scientific Asst. K. R. Glennan. Relieved at Macon, Ga. Proceed to Houston, Texas, on special temporary duty. Jan. 8, 1918.

EDITORIAL NOTES

Editor: E. G. EBERLE, Bourse Building, Philadelphia, Pa.
Committee on Publication: J. W. ENGLAND, *Chairman;* G. M. BERINGER, CASWELL A. MAYO, H. B. MASON, E. L. NEWCOMB, and the Editor-in-Chief of the JOURNAL, General Secretary, Treasurer and Reporter on the Progress of Pharmacy, *ex-officio.*
Editorial Office: 253 Bourse Building, Philadelphia, Pa.

ACTIVITY OF WILD AMERICAN DIGITALIS.

Reprint No. 391 from the *U. S. Public Health Reports* is of particular interest at this time. Martin I. Wilbert had called attention to a neglected source for obtaining digitalis, namely, the collection of the wild-growing plant which has escaped from cultivation and become a weed in various sections of the United States, more particularly in the northwest, where it is found growing in abundance and of the pharmacopoeial variety, *Digitalis purpurea.*

The author of this report, George B. Roth,[1] technical assistant in the Division of Pharmacology of the Hygienic Laboratory, U. S. Public Health Service, in the preliminary remarks, states that in order for these plants to be of commercial importance, it is necessary that the drug come up to pharmacopoeial requirements. This question prompted the investigation of the subject.

The examination concerns the activity of four samples of wild-growing leaves which were collected in Oregon during the season of 1916 and one sample from Washington. For the purpose of comparison, examination was also made of *cultivated* digitalis leaves which were grown in Washington during the season of 1916. The report also includes a sample of the season of 1914 grown in Wisconsin and another in Ohio. Tinctures were made according to the U. S. Pharmacopoeia and their activity determined physiologically by the present U. S. P. method.

All of the Oregon digitalis was collected near Astoria. Sample 1 consisted of leaves gathered from first-year plants about six weeks after the flowering time. They were rather dark in color and the hairs practically free from soil. Sample 2 consisted of leaves from second-year or older plants, about six weeks after flowering time. These were light green in color. Sample 3 consisted of leaves from flowering plants, and Sample 4 of leaves which had partially dried on the stalk and were yellowish green in color. The largest and best leaves were from plants which grew on moist ground where the plants were shaded about half the day. Too much shade prevents the proper development of the leaves, while long exposure to the sun causes the leaves to turn yellowish.

All of the samples were air-dried immediately after the leaves were collected, except the sample which was dried on the stalk. The process of drying with these samples was as follows: The gathered leaves were spread out in thin layers on floors over which the air could circulate freely and the leaves were stirred frequently, at least every other day. About three weeks were required to dry them thoroughly.

The Washington samples were collected by Prof. A. W. Linton, of the University of Washington, College of Pharmacy. Sample 5 consisted of leaves from plants growing wild near Seattle and were collected in August, while the plants were in blossom. They were air-dried, very dry and brittle and of a yellowish tinge. Sample 6 consisted of leaves from cultivated plants of second-year growth, obtained from the drug garden of the College of Pharmacy. They were collected in November 1916, and were the second growth of leaves for the season. The Wisconsin sample, which is reported on as Sample 7, consisted of leaves from first-year, cultivated Wisconsin digitalis, and collected in 1914 before flowering. They were supplied by Prof. Edward Kremers, of the University of Wisconsin. Sample 8 consisted of leaves from first-year cultivated digitalis grown in Cincinnati, collected in November, and supplied by Prof. John Uri Lloyd.

The first two Oregon samples were assayed

[1] "The Activity of Wild American Digitalis," by George B. Roth. Reprints may be had from Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents per copy. (Postage stamps not accepted.)

on a lot of frogs received in October. The other two and those from Washington were assayed on a lot of frogs received in November. All of the samples were assayed on *Rana pipiens*, which were all obtained from the same dealer. Neither the Wisconsin nor the Ohio digitalis was standardized except as to the lethal dose of sample tincture. The first lot of frogs standardized against ouabain showed the lethal dose of 0.00000055, and the other lot of 0.00000045. The lethal dose of standard tincture digitalis of the first two Oregon samples was 0.0066 and of the other samples 0.0054. The lethal dose of sample tincture consecutively was as follows: 0.004, 0.005, 0.004, 0.003, 0.011, 0.007, 0.003, 0.006. The corrected lethal dose of sample tincture is as follows: 0.0036, 0.0045, 0.0044, 0.0033, 0.0121, 0.0077.

From this it will be seen that all the samples of wild Oregon digitalis were stronger than pharmacopoeial sample. The author states that, while this investigation has shown that of the tinctures made from wild-growing digitalis the Oregon samples were several times stronger than that grown in Washington, it should *not* be concluded that wild Oregon digitalis is generally more active than wild Washington digitalis.

It was especially surprising to the author to find that Sample 4, which was made from leaves which had partially dried on the stalk, was the most active of the Oregon samples. These leaves were yellowish green in color and would ordinarily be regarded as leaves of poor quality. The investigation also shows that time of collection has very little to do with the activity. It is also significant that all of the samples were air-dried, notwithstanding that many authorities claim that special methods of drying are necessary to secure a good product. The author concludes that "the wild digitalis which is found in the northwestern states may be utilized as a source of supply for making the various official preparations of digitalis, and that by using ordinary methods in handling and preparing the leaves we may secure a highly active product, which compares favorably with the activity of cultivated leaves grown under more favorable conditions."

Dean Adolph Ziefle, of the School of Pharmacy, has undertaken to collect digitalis in Oregon. A circular issued to farmers and others gives the methods of collecting and drying.

GUIDE TO CHEMISTRY 40.

PLANT CHEMISTRY FOR PHARMACY STUDENTS.

The first edition of this guide was published in 1911 and the present issue is by Nellie Wakeman and published by the University of Wisconsin. Dr. Edward Kremers states in the introduction that this pamphlet is not a text-book or laboratory manual, but merely a guide to both instructor and students.

"It is designed for the pharmacy students of the University of Wisconsin who are required to take plant chemistry as a three-credit study throughout the senior year. For a number of years, this course, together with pharmacognosy, which is given simultaneously as a two-unit hour course, has taken the place of the former course in materia medica.

"In the four-year course, pharmacognosy is preceded by vegetable histology, morphology of the flowering plants, and by general biology; plant chemistry, by pharmaceutical chemistry, inorganic and organic, and by general chemistry, inorganic preparations, organic chemistry, qualitative and quantitative analysis.

"During the first semester, experiments that do not involve a knowledge of advanced organic chemistry are selected, such as the isolation of starch, esterification of fatty and volatile oils, etc. The old-time groups of plant chemical constituents are followed: oleoresins, resins, volatile oils, etc., *i. e.*, constituents that are not chemical units but more or less natural mixtures. During the second semester definite chemical compounds are studied, such as the constituents of the volatile oils, the alkaloids, glucosides, etc."

The guide is divided into fourteen chapters, the first one on "water" and the last dealing with "proteins." The second chapter is on "enzymes" and will serve to explain the plan of presentation:

"The term enzyme is used to designate a class of complex organic substances, of unknown composition, existing in plant and animal tissues, and capable of accelerating chemical action. In the presence of enzymes, also known as unorganized ferments, chemical changes readily occur which would otherwise take place only slowly, or possibly not at all, under the same conditions of temperature, concentration, etc. As a rule the action of enzymes is checked by either increasing or lowering the temperature materially, also by the presence of certain poisons, antiseptics, or anesthetics.

"The chemical composition of enzymes is largely a matter of speculation. So far as is known, they are non-crystallizable substances, generally soluble in water, salt solutions, or glycerin. They are precipitated from their solutions by the addition of alcohol and by some neutral salts, such as ammonium sulphate. Probably an enzyme has never yet been obtained in a pure condition. Attempts at purification usually end in the diminution, or complete destruction, of the activity of the material examined."

Then follows a general classification and sub-classification, concluding with a statement relative to enzyme action. Then follow references, exercises and a series of experiments to be conducted by the student.

COMPILATION OF DIGEST OF COMMENTS ON THE U. S. P. AND N. F. CONTINUED.

The work of compiling the series of Hygienic Laboratory bulletins entitled *Digest of Comments on the Pharmacopoeia of the United States of America and on the National Formulary*, which was interrupted by the illness and death of Technical Assistant Martin I. Wilbert, has been resumed by Dr. A. G. DuMez, who was appointed to succeed the former June 1, 1917. The Digest of Comments for the calendar year ending December 31, 1915, has been completed and is ready for publication, and considerable progress has been made in the preparation of the abstracts for the 1916 bulletin.

A WAR TAX RULING.

C. E. Fletcher, Deputy Commissioner of Internal Revenue, Washington, D. C., has sent out the following ruling:

"Where goods manufactured by a person require further manufacture before being used by the consumer, *the one completing the manufacture is liable for the tax.* The same rule would apply to bulk goods that require to be bottled or otherwise prepared in order to put them into a salable condition. *Therefore the person preparing the goods in smaller packages and labeling them is the manufacturer within the meaning of the Act.*

"Where a manufacturer prepares a certain article, wrapped and labeled in a salable condition, and for the purpose of advertising will attach the name of any dealer who will handle the same, such a manufacturer is subject to the manufacturer's tax as provided in this section. *The dealer who handles the goods has no interest whatever in its manufacture and his name is simply placed upon the label for advertising purposes.*

"Where a manufacturer prepares an article according to a formula furnished by a dealer and also labels and puts the article into a salable condition, with the dealer's name stamped thereon, such a dealer will be considered the manufacturer, since he holds title to the formula by which the article is prepared."

Dr. A. Homer Smith, at a meeting of the General Medical Board of the National Council for Defense held January 13th, reported on the drug situation, detailing important data regarding chemical glassware, digitalis, alkaloids used in ophthalmic practice, novocaine, mercury, and other drugs. He pointed out the urgent need of supply and conservation, and pleaded for complete coördination of all branches of the Government on all subjects pertaining to drug and chemical need.

Dean Wilbur J. Teeters was unfortunate in having his residence destroyed by fire. Very little of the household goods escaped destruction or damage.

OBITUARY.

IN MEMORIAM.

JOSEPH PRICE REMINGTON.*

1847–1918.

WHEREAS, In the demise of Joseph Price Remington, American Pharmacy has lost its foremost figure and the Philadelphia College of Pharmacy its most distinguished son, therefore be it

Resolved, That we, the members of the Philadelphia College of Pharmacy, in special meeting assembled, express our deep sorrow at his passing and pay tribute to his work and worth.

As a pharmacist, he labored in all the branches of pharmaceutical practice—retail, wholesale and manufacturing, acquiring an unusually wide experience. He graduated from the Philadelphia College of Pharmacy

* Resolution adopted by Philadelphia College of Pharmacy.

in 1866, the subject of his thesis being "Our *Alma Mater*, Its Rise and Progress," little dreaming, perhaps, that he was destined to become a most important factor in the development during the next fifty years.

As an educator, he was trained by Edward Parrish and William Procter, Jr., his teachers, two of the greatest pharmacists that American Pharmacy has produced. In 1874 he was elected to the chair of Theory and Practice of Pharmacy of his *Alma Mater*, later becoming also professor of Operative Pharmacy and director of the Pharmaceutical Laboratory (1877) and then dean of the College (1893). He has taught thousands of students. He was an impressive teacher, presenting his subjects in a logical and practical manner; his language was clear and forcible and his voice distinct and penetrating. He had a magnetic personality and his lectures made a deep and lasting impression. He was the "students' friend," beloved by all. He may have been said to have been a teacher of teachers, for most of the successful teachers of pharmacy in America to-day have been pupils of his at some time in their careers.

Not only this, but he exercised a potential influence upon pharmaceutical education generally, being most active in developing many improvements and important changes in methods of teaching. His method of instruction in operative pharmacy led to the creation of a pharmaceutical laboratory in the Philadelphia College of Pharmacy, the first of its kind in this country, the essential features of which have been adopted by nearly all the colleges of pharmacy in the United States, and he was the first to visualize the importance and necessity of teaching commercial pharmacy in schools of pharmacy and to establish such a course.

As an author of pharmaceutical text-books, he had a national and international reputation. He was the author of the "Practice of Pharmacy," first issued in 1885, used in every college of pharmacy in this country, and widely known abroad; and associate editor of the United States Dispensatory since 1879, the fifteenth edition of which was published in 1883. This edition and the later ones have proved to be the most successful ever issued. Prior to 1883, the work was edited entirely by physicians; since then American Pharmacy has been honored by placing upon the title page of this book the name of a pharmacist as one of its editors and has been properly recognized in its relation to medicine.

As a member of the American Pharmaceutical Association he was most active. Joining in 1867, he served the Association in many capacities, being a regular attendant at the annual meetings, taking a leading part in its discussions and presenting papers on many important subjects, as the volumes of the Proceedings and JOURNAL since 1868 bear ample testimony. His good judgment and safe advice were constantly in demand. He was chairman of many important committees. He proposed the plan which was adopted for the establishment of the Council in 1880 and was its chairman for seven years. In 1887, he elaborated a plan for the reorganization of the Association, dividing the scientific work into sections and secured its adoption. He was president in 1892–93 and permanent secretary in 1893–94.

In 1887, the American Pharmaceutical Association appointed him as a delegate to visit the American Medical Association, and he induced that association to establish a section of Materia Medica and Pharmacy, which has since become the "Section of Pharmacology and Therapeutics." He was chairman of delegations subsequently sent to this association, and on such occasions rendered valuable services in bringing the professions of medicine and pharmacy into closer relationship.

Not only in national pharmaceutical affairs was he active, but he took a deep interest in the growth and development of the state associations, frequently attending their annual meetings, making addresses and presenting papers. He was one of the charter members of the Pennsylvania Pharmaceutical Association in 1878 and its president in 1890.

As an executive and leader of men he had international fame. He was president of the Seventh International Pharmaceutical Congress (1893), a delegate to the Pan-American Medical Congress (1893) and the second Congress in Mexico (1896); represented the United States in the Eighth International Pharmaceutical Congress at Brussels (1896) and was president of the pharmaceutical section of the Eighth International Congress of Applied Chemistry (1912). He received the honorary degree of Master of Pharmacy from the Philadelphia College of Pharmacy and the Northwestern University of Illinois. He was a fellow of the Chemical, the Linnean and the Royal Microscopical Societies of Great Britain; and honorary member of the *Pharmaceutische Gesellschaft zu St. Petersburg, Institute Medico*

Nacional of Mexico, *Societe Royal de Pharmacie de Bruzelles, Societe de Pharmacie d'Anvers;* an active member of the American Philosophical Society, American Chemical Society, American Geographical Society, Academy of Natural Sciences of Philadelphia, Historical Society of Pennsylvania, Pharmaceutical Society of Great Britain, British Pharmaceutical Conference, and a member of the Federations *Internationale Pharmaceutique* of The Hague, Franklin Club of Philadelphia, Chemists' Club of New York and Authors' Club of London.

But his greatest work probably was as chairman of the Committee of Revision of the Pharmacopoeia of the United States of America, a work which has become of vast importance by reason of its legal standing under the Federal and State Food and Drug Acts. His connection with the U. S. Pharmacopoeia began in 1877, when he served on an auxiliary committee of revision. In 1880, 1890 and 1900 he was sent as a delegate of the Philadelphia College of Pharmacy to the national conventions and in these served as first vice-chairman of the final committee of revision. Upon the death of the chairman of the committee in 1901, Professor Remington was made chairman, and was again elected in 1910, holding the position until his death. The ninth revision, issued in 1916, may be truly called his monument, since the whole work is stamped with his personality.

As a man, "we ne'er shall look upon his like again. Genial, eloquent, clean-hearted and clear-minded," possessed of unusual natural ability coupled with rare executive capacity, he served his day and generation, loyally and enthusiastically, and left a record of achievement that may well serve as an example to future generations.

Just a personal note: Professor Remington was gifted with a charming personality. His courtesy, his tact, his ability to adapt himself to all types of people, made friends of all those he met, while his strong, clean intellect served to inspire them. The meaning of his departure from life may be expressed in the words of S. Weir Mitchell's poem, "Evening," in which is said:

"I know the night is now at hand,
The mists lie low on hill and bay,
The autumn sheaves are dewless, dry,
But I have had the day.
Yes, I have had, dear Lord, the day;
When at Thy call I have the night,
Brief be the twilight as I pass
From light to dark, from dark to light."

Resolved, That this appreciation be entered upon the minutes of the Philadelphia College of Pharmacy, and a copy sent to the family of the deceased.

J. W ENGLAND, *Chairman,*
SAMUEL P. SADTLER,
CHARLES H. LAWALL,
JULIUS W. STURMER,
HARRY K. MULFORD,
Philadelphia, January 4, 1918 *Committee.*

GEORGE M. BERINGER.

In the decease of Professor Joseph P. Remington, American pharmacy has lost its most renowned advocate and its most eminent teacher. During the past quarter of a century, no other individual has occupied such a commanding position or exercised so great an influence in matters pharmaceutical.

Gifted by nature with superior qualifications, with a laudable ambition and an upright character, with keen perception and good judgment, by a determined will and self-application and study, he steadily advanced through all the stages of a pharmacist's career from apprentice boy to the leadership in his profession. Well deserved were all the honors that were accorded to him both at home and abroad.

As a pharmacist, as a teacher and as an author, his efforts were continuously directed toward the advancement of his chosen calling. As a teacher he was preëminent, gaining not only the attention to studies but, by his genial personality, likewise, the esteem and affection of his students. By his moral as well as technical instruction, he inculcated deeply in the minds of thousands of pharmacy students the ethics of the profession and a realization of the duties and responsibilities of its followers. These impressions through their example and life will continue an ever-broadening influence. His text-books are the accepted authorities for the teaching of pharmacy and will perpetuate his work and usefulness.

As chairman of the Committee of Revision of the United States Pharmacopoeia he demonstrated to the best advantage one of his greatest characteristics, namely, his ability as a leader and harmonizer. The problems associated with the revision of the Pharmacopoeia were numerous, and trying was the position of the chairman. It was greatly to his credit that satisfactory conclusions were reached in practically every matter and to him must be given due share of credit for the notable advances that have been made in the

two revisions that appeared under his chairmanship. Truly, he has left a monument in the services rendered to his fellow-men.

To this noble spirit who by Divine command has completed his earthly labor and who in the zenith of his power has passed on to eternity, we acknowledge our indebtedness as individuals and as a world benefactor. We will ever honor and cherish his memory and revere his example.

FREDERICK J. WULLING.

I first met Professor Remington in 1885 at the New York College of Pharmacy in its old building on East 23rd Street near Third Avenue on the occasion of one of his frequent visits to Prof. P. W. Bedford, whose lecture assistant I was at the time. The occasion is still very clear in my mind and I well remember the genial and cordial fraternal greeting and advice he gave me at the time. Shortly before, I had come into possession of his "Practice of Pharmacy" and in its study had acquired a profound regard for the author, marveling, in my youthful enthusiasm, at the learning of a man who could write so voluminous and comprehensive a work. To meet so distinguished and able an author and teacher was to me at that time and would be to-day a distinct honor. That the professor was so genial and approachable a man came to me as a most pleasant surprise. I have realized since that one of his chief charms lay in his friendly and sincere interest in the struggling student. He saw in every student the potential qualities of a leader in pharmacy. He told me frequently that he regarded it a privilege to be a teacher of young men and women for he regarded them with himself as co-trustees of the profession he loved so well. His popularity was due more largely to the esteem in which students held him than to any other one factor, not excluding his important work in the revisions and development of the Pharmacopoeia.

During my thirty-two years of co-work with him in the cause of better pharmacy, the sincerity of our friendship grew constantly and that despite the fact that for the past twenty-five years we differed materially on the questions of higher academic and professional requirements for professional pharmacy. The professor could never quite agree with my convictions that it is the duty of pharmacists in high positions to use their influence and power to the utmost degree to advance educational standards to a point commensurate with the value and dignity inherent in so responsible a calling and service as pharmacy. I feel that his unquestioned and profound affirmative influence on pharmacy could have been even greater had he shared these convictions. But American pharmacy and its posterity will ever feel grateful for his very large share in its uplift and development. His departure from this mundane life leaves a distinct void. His many friends have suffered a great personal loss and pharmacy at large an irreparable one. His place and influence in American pharmacy is assured for all time and as the years will lend perspective to his life and work posterity will appreciate him even more greatly than his contemporaries did.

JOHN G. GODDING.

The passing away of Prof. Joseph P. Remington removes from the American Pharmaceutical Association one of its widely known members. His ability as a teacher, author and collaborator on the United States Pharmacopoeia made him one of the best known in American pharmacy.

The completion of the U. S. P. IX of which he was chairman of the Revision Committee, to quote his words, "The best Pharmacopoeia in the world," was the rounding out of an active life devoted to pharmacy. It was the writer's privilege to meet the professor at the annual meetings of A. Ph. A. and enjoy his companionship traveling in the many varied trips to the Association conventions. Thus passeth another friend.

J. W. ENGLAND.

The outstanding features of Prof. Remington's personality were, it seems to me, three in number—his unusual ability, his unusual force of character and his unusual courage.

His ability was inherited and acquired. He had a keenly retentive memory, and a fine, discriminating judgment in appreciating the relative values of facts. He was exceedingly painstaking in his consideration of details. He had a deep knowledge of the science of his profession coupled with rare executive capacity, an unusual combination of scientist and executive; and he knew, as no other, the possibilities and limitations of every active research worker in American pharmacy. He had practical experience in all the branches of pharmaceutical practice—the retail, wholesale and manufacturing, and acquired thereby unusual breadth of view.

His force of character was unusual. Strong and positive in his opinions, he was not hasty in forming them, and was tolerant of the opinions of others, and exceedingly patient. His anxiety was to be right in his decisions and to "play fair" with his opponents. He believed that might may win for the moment, but that right, eternal right, which is only another name for Truth, triumphs through the centuries. He never grew "stale." He always kept young by associating with young people.

He had unusual courage. At a meeting of the Board of Trustees of the Philadelphia College of Pharmacy held last spring, I asked Prof. Remington as to his physical condition and expressed my sympathy. He replied: "I am near the end of my life!" He said this calmly and with a smile. He was "At the End of the Trail" as exemplified by the wonderful status of that title at the San Francisco Exposition typifying the final extinction of the Red Man—the Indian on a pony, both "all-in," utterly exhausted, incapable of going further, at the brink of a precipice overlooking a dark valley. And the point is, he spoke of his "passing" without a trace of fear—with a smile on his lips and immortality in his eyes. He was unabashed and unafraid of Death, ready to go down into the Dark Valley and face his Maker! This was courage, real courage, unusual courage. And such a courage he exhibited time and time again in the crises of his life.

C. A. MAYO.

The death of Professor Joseph Price Remington removes the most prominent figure from the field of American pharmacy. Others have won reputation for themselves by good work in some one particular phase of pharmacy, but no one name in pharmacy is so well known in America or in the English-speaking world as a whole as that of Professor Remington. Indeed his name is known not only in the English-speaking world, but throughout the civilized world as a leader in pharmacy. His death will bring grief to thousands of friends in Europe as well as in America. He leaves behind him a monument to his skill as an editor and his knowledge of pharmacy in his "Practice of Pharmacy," the sixth edition of which made its appearance almost coincident with his death, and in the ninth revision of the Pharmacopoeia, the labor on which was probably indirectly responsible for his illness. But above all he leaves in the hearts of his friends in pharmacy, and their name is legion, grief which time can not assuage, and a profound sorrow at the loss of a man of such wide knowledge, great skill, sound judgment, deft diplomacy and lofty ideals. As a teacher he was an inspiration, as an editor and a coördinator of the work of others, he was a master; as a director in association affairs, he was the essence of diplomatic tact and an able and a wise stabilizer; as a man he was pure in mind and had a positive genius for friendship binding his friends to him by countless evidences of considerate kindness. Pharmacy and pharmacists lose much by his death.

H. W. WILEY.

I have known Doctor Remington intimately for over a third of a century. I have been professionally in touch with him constantly during the ninth revision of the U. S. Pharmacopoeia. His death, therefore, to me is both a personal and professional loss.

I think few will deny Professor Remington's hegemony in pharmacy in the United States, and we may well claim it also in the pharmacy of the world. His was a life of industry. He never flinched by reason of the tasks imposed upon him. He was a glutton for work. The extent of his knowledge outside of his chosen profession was phenomenal. As a teacher he had few equals. He was a voluminous author. He received all the honors which American pharmacy has to offer. He bore them with becoming simplicity. He was never dogmatic or imperious, but always diplomatic and tractable. If Louis the Fourteenth could say "*L'Etat c'est moy*," with equal justice we can say "*La Pharmacopoeia c'est lui*."

As a friend he was incomparable. His hearty laugh gladdened every social function which he honored with his presence. As an after dinner speaker, he was always excellent, pertinent and concise. In his public addresses he was enlightening, entertaining and didactic. Doctor Remington lived the allotted term of life. He was three score and eleven at his death. It may not be true that the good die young, but it is true that the good die young no matter how long they live. Doctor Remington died young. He died as he had lived, true to the highest ideals of manhood.

S. SOLIS COHEN.

It is hard, while our loss is recent and our grief acute, to pen a just estimate of Joseph Remington. The love and veneration in

which he was held by the many thousands of his students, the sincere affection that was joined with the respect and admiration of his colleagues in pharmacy and in medicine, the universal esteem of the community, testify to the high character and the noble qualities of the man.

The value of his scientific and pedagogic work can only be appreciated by those who knew what pharmacy and pharmaceutic teaching were when he began his career as a teacher and can contrast these with the heights to which they have now attained and the upward path opening before them. To this great advance, Professor Remington contributed in no small measure; and many of those most active and efficient in the work have been inspired by his word, taught by his example, and encouraged by his sympathetic recognition and assistance.

His work on the Pharmacopoeia, and especially the Ninth Revision, speaks for itself. Of this last book, it is not too much to say that but for the tact, the patience, the wisdom, the broad knowledge, and the sincerity of Joseph Remington, it might have "died aborning," and although it is not in all respects the book he wished it to be, yet he succeeded in carrying it far toward his ideal. To those who know its value and all that it stands for in scientific pharmacy and practical medicine, it is no unenviable monument to the great man whom we were privileged to call friend, and whom we sincerely mourn.

FREDERICK B. POWER.

It is my sad privilege to record in this place a brief but heartfelt personal tribute to the memory of the late Professor Remington. It is difficult to realize that he has passed from us, and that his genial and kindly presence will no longer be seen among men.

Among the professional friends of Professor Remington, there are probably few now living who can look back upon a longer acquaintanceship with him than the writer of these lines, for it had extended over a period of nearly half a century. It was in the spring of 1872, while engaged in the pharmacy of the late Prof. Edward Parrish, at Eighth and Arch Streets, Philadelphia, that I first met Mr. Remington, who was then in the service of Messrs. Powers and Weightman of that city, and, it may be noted incidentally, it was in the same year that I became a member of the American Pharmaceutical Association. At that time the instruction in the Philadelphia College of Pharmacy was restricted to evening lectures during a period of about five months, from October to March, and Mr. Remington was then a lecture assistant to Professor Parrish, but he also conducted an evening class in pharmacy during the summer months, of which I was a member, and I still cherish a happy recollection of all the associations connected with those early days. On account of the sudden death of Professor Parrish in the summer of 1872, Professor William Procter, Jr., who had previously retired from active service in the college, was called to take his place, but Mr. Remington still retained the position of lecture assistant, and, in the demise of Professor Procter, at the close of the lecture session in 1874, was elected to the professorship of pharmacy, the duties of which he so long and faithfully fulfilled. Many changes have naturally taken place during this long interval of years, and but few now remain of the group of worthy men who in my youthful days were the recognized leaders in American pharmacy.

Within the past two decades it was my privilege to meet Professor Remington on several varied and happy occasions, such as the meeting of the International Pharmaceutical Congress held at Brussels in 1897, and at the opening of the session of the School of Pharmacy of the Pharmaceutical Society of Great Britain, in London, in 1913. On the latter occasion, he was accompanied by his friend, Professor Julius A. Koch, and his almost youthful buoyancy of spirit, which was so marked a characteristic of his nature, was observed then to be still retained. My last meeting with the departed friend was in the closing days of December 1914, when I enjoyed the hospitality of his home in Philadelphia.

It would seem needless to remark how greatly Professor Remington will be missed, not only at the college with which he had so long been connected, but in all pharmaceutical circles throughout the land, and the news of his departure from this life will have been received by the almost countless number of friends and former students with a deep sense of personal loss.

WILBUR L. SCOVILLE.

It is very difficult to speak in any adequate manner of Professor Remington. His loss is personal, professional and international. Great numbers of us will not try to decide which loss is the greater. As a personal friend he was big enough for all lovers of pharmacy.

Not merely his own students and associates, but every advocate of the higher in pharmacy found in him an inspiration and also a human personality that attracted. His personal charm was a rare quality, and a large factor in his influence.

Professionally he was the diplomat of pharmacy. His tact, judgment and ideals enabled him to accomplish much for the advancement of professional pharmacy. He was in touch both with the commercial and the professional phases. He was shrewd in his judgments and loyal to ideals. His insistence on a recognition of commercial demands upon pharmacy is a factor that may appear of more importance in the future than it has in the past. Here he exercised an influence on the pharmacy schools which some have deplored and some have praised. Perhaps neither extreme is best, but if the mean is to be attained—and is the wiser part—both sides need their advocates, and there have been few strong educators who could keep a hold on the commercial as well as the purely professional phases of pharmacy.

As dean of the Philadelphia College of Pharmacy, as president and a long-time leader of the American Pharmaceutical Association, as chairman of the U. S. P. Revision Committee, and as delegate to numerous other societies, both here and abroad, he was the most diplomatic representative of pharmacy. Space forbids the relating of interesting illustrations of his sagacious meeting of difficulties. Doubtless our literature will show many of them in future reminiscences. He was usually ready, he knew how to use humor, he was astute in attacks and discreet in doubtful conditions, a real diplomat.

He is lost to the present, but not to the past or to the future. He moulded pharmacy during his life, and his influence will continue into the future. He is gone, but not lost.

L. E. SAYRE.

It is impossible, for one who has felt himself, from his college days, Professor Remington's very close friend and associate, to put into word his innermost thoughts concerning him. We studied together and our college interests were the same. Since 1885 I have been rather far removed from personal contact and, for this reason I think, I have appreciated him —at this distance—more than his contemporaries at home. There was something truly great in Professor Remington; he had a brilliant mind and it was truly sound, embracing equally great and small things. I often wondered, when I had the pleasure of meeting him with his associates at the annual pharmaceutical conventions, whether these familiar associates appreciated his greatness as much as I. Egotistical as it may seem, now that he is gone, I can not help but feel that I knew *his greatness best*, partly because of the conditions mentioned.

H. V. ARNY.

Among the many tributes now being laid at the bier of Professor Remington, I desire to add a tribute of gratitude. Few men did more for me than did my great teacher, who did much to change the callow youth into a thinker. How we boys of thirty years ago revelled in the delightful lectures of Professor Remington, who illumined every necessary fact with a merry jest, a clever phrase or a bit of homely philosophy. How we admired Remington the man; the kindly one who was always ready with words of encouragement.

And so it has been ever since. Always courteous, always ready to serve his "boys" scattered throughout this great Republic, he drew to himself an admiring following, the like of which is scarce likely to be found again in American pharmacy.

And so in these hours when we feel most keenly his loss, we can at least be thankful for one thing. Each of us who loved him can say "I am rich in having known him."

OTTO RAUBENHEIMER.

During the International Congress of Applied Chemistry, held in New York City in September 1912, at which Professor Remington was chairman and the writer secretary of the Section on Pharmaceutical Chemistry, I had the good fortune of becoming intimately acquainted with the "Great-Master" of Pharmacy in the United States. Not only did I get thoroughly impressed, but also convinced of his wide knowledge, his lofty ideals, his true love for pharmacy, his unselfishness and his noble character. These properties were greatly admired by all who came in touch with him.

The pharmaceutical as well as the medical profession will be forever thankful to Remington for the splendid manner in which he, as chairman, carried on the revision of the U. S. P. IX. He deserves special credit for harmonizing the frequently conflicting views of the two professions. Truly his wish, which he expressed in the U. S. P. convention in Wash-

ington in 1910, was fulfilled, to make this work "the peer of all Pharmacopoeias."

Remington was the foremost figure in American pharmacy. His fame was not only local, but national, in fact, international. Although he departed, three monuments will remain which will forever remind the pharmaceutical, chemical and medical professions, as well as the Government officials, of Remington, namely, the U. S. P. IX, his "Practice of Pharmacy" and the U. S. Dispensatory.

Let us hope that the name "Remington" will be an everlasting inspiration to the pharmaceutical profession!

SEWARD W. WILLIAMS.

The great loss pharmacy has suffered in the passing on of Professor Remington falls as a personal bereavement on each of us who were privileged to know him well. Way back in our early pharmaceutical training, and ever since, Remington and Pharmacy have been as nearly synonymous as man and profession could be.

He will live in fond recollection as long as memory lasts. He will live in the great books which we regard as the "Scriptures" of pharmacy. He will live in our lives, which should be lengthened by his precept and example; for was there ever a man who had better solved the problem of balancing work and relaxation? But perfect as his balancing of work and play seemed to those of us who enjoyed his genial humor and good fellowship, as on long trips to A. Ph. A. conventions, he carried too heavy a load; for the profession—for us.

His three score years and ten were crowded with a century of service. He has paid "the last full measure of devotion." Words fail to express our sorrow, our admiration, our gratitude.

JOHN F. HANCOCK.

Professor Remington and I were close friends since 1876 and this friendship continued to the close of his life. I first met him in Richmond, in 1873, at the meeting of the American Pharmaceutical Association. Three years later I met him at the World's Fair in Philadelphia, and we were much together at that time and our close friendship possibly dates from that period. I confided in his judgment. He had a rounded, genial disposition and was companionable. He is a great loss to pharmacy and the Association, but he will live in the memory of those who survive him and will continue to serve as a beacon light to those who enter pharmacy.

E. FULLERTON COOK.

Those of us who were close to the home life of Prof. Remington have known for months that he was critically ill, yet, when the reality of his death came upon us, the shock was no less than to the many friends who then learned for the first time of his illness.

This was probably due to that quality which has been a dominant factor in his career, namely, his unswerving faith that victory must come and his unwillingness to accept or acknowledge defeat, no matter how dark the outlook and he never gave up hope of regaining his health. This strong will carried him through the last year of hard work on book revision, kept him at work on the manuscripts for months after he took to his bed, and perhaps kept him here to fulfill his ambition to see and hold a copy of the new "Remington" and to know that the Dispensatory was on the press.

But as many will write of his scientific achievements and of those splendid qualities of friendship, leadership and teaching ability evidenced throughout his many years of active service in the profession he loved, I shall confine these few words of tribute to those more intimate and personal qualities which it was my good fortune to know through years of friendly relations, almost as intimate as those of father and son.

One of the outstanding facts and influences in his life has been a deep religious conviction and a faith in the guidance of the Divine Spirit. Many problems, personal and business, were settled only after leaving them, as he would say, for "the Voice to show the way." This custom made his decisions preëminently just and usually right and probably explains the reason for that confidence in his judgment shared almost universally by his colleagues.

His interest in the little church at Longport, where he gave so many years of loyal service in every capacity, even to that of lay-reader on occasion, his work for young men as Bible Class leader, head of the Brotherhood and as vestryman at Holy Trinity, Philadelphia, and his ever-present sense of responsibility for the students' moral welfare, are but other evidences of the spiritual side of his life.

Another quality which made an impression upon those close to him was the desire to be fair and entirely above reproach in all of his dealings with associates, and especially in the responsible offices to which he was chosen.

In pharmacopoeial work he tried always to give every member the fullest opportunity to place his views before the Committee, and, on numerous occasions reopened questions when some member expressed dissatisfaction or desired to present a new argument. The purpose was always to arrive at the right solution.

His interest in text and reference books which used pharmacopoeial facts, often placed him in an embarrassing position, since it might be thought that he had taken advantage of the opportunity to obtain information in advance, for his personal benefit. His stand on this question was fixed and definite although it meant a financial loss, but he felt that the honorable fulfilment of his duty to the Pharmacopoeia required his undivided attention until its problems were settled and the manuscript and proof reading entirely out of his hands. Then, and then only, would he take up the revision of his own books and the time elapsing between the appearance of the U. S. P. and the publication of the other books, about two years, in both the Eighth and Ninth Revisions, bear evidence to this policy.

His sense of humor and story-telling ability was one of the charms of his companionship, and yet here was brought out a fine quality of mind. His stories were always clean and they never carried a sting or hurt. He detested the "practical joker" and had no sympathy with the man who retailed immoral stories.

While the passing of this brilliant life has left a vacancy hard to fill, the one thing he has tried to do has been to instill his own faith in the future of pharmacy in the minds and hearts of many whom he was privileged to know and he had faith to believe that the cause he loved would "carry on" and thus, his greatest work as an inspirational teacher, be accomplished.

JULIUS A. KOCH.

Professor Remington was indeed a lovable, whole-souled man, always enthusiastically on the lookout for some means of advancing his chosen profession. His enthusiasm was the constant source of inspiration to those with whom he was in contact.

Ever keenly alive to what was going on around him he made a most delightful traveling companion and my close association with him for two months in the fall of 1913, on our trip to Europe to attend the Eleventh International Pharmaceutical Congress at the Hague, will always be to me the source of most delightful memories.

H. M. WHELPLEY.

In these stirring times of intense mental strain we are prepared for startling news. The announcement of the death of Joseph Price Remington is startling, even though not unexpected. It is startling because it causes us to realize how brief is the notice as we approach the passing of one who has been foremost as a representative of American pharmacy for more than a generation. It is startling because it brings home to us what can be accomplished by a single individual who industriously makes use of natural ability. It is startling because we see how quietly great changes take place and the work in any particular line of human activity goes on with little interruption. It would be useless to try to review the work of such a man in a brief paragraph. I must, however, point out that what man has done, man may do and the field is before thousands of young men in pharmacy today who have the life and work of Remington given them as an incentive.

J. W. STURMER.

American pharmacy has produced its fair quota of eminent men—scientists, teachers, writers, men of affairs; but the name which will stand out in bold relief through the years to come, is the name of the distinguished pharmacy teacher who so recently laid aside the crayon and the pointer of the class room, and folded his hands in rest—Professor Joseph Price Remington.

His life spans the epoch of transformation during which the old-time apothecary passed into history, and modern pharmacy in its various branches came into being; and during all these eventful years Professor Remington was a power which made a lasting impression upon American pharmacy.

Nature had endowed him splendidly: a commanding presence, a clear, pleasing voice, cordiality of manner, good nature, and a smile which was contagious—in short a magnetic personality. In his addresses he coupled logical exposition with humor and wit, and on occasion thrilled his hearers with fiery bursts of impassioned oratory. Naturally, he was a leader. Naturally, in the class room, he was a stimulating force—a catalytic agent who succeeded in energizing his students to study and to work. And throughout this broad land there are thousands of former students of this extraordinary teacher doing worth-while work—compounding, manufacturing, testing, inventing, writing, teaching—who

trace their inspiration to his lectures. The service which Huxley performed for biology, and Tyndal for physical science, Professor Remington rendered to pharmaceutical science; he popularized it, gave it human interest, gave it life.

But it is not my purpose to marshal in review his many achievements. It is but my humble desire to pay a tribute to a man who was great—and whose fame rests upon his service to pharmacy. As long as illness and pain is the common portion of the sons of men, there will be work for the makers of medicines; and therefore the name of Professor Joseph Price Remington, the great pharmacy teacher, will endure.

Some men attain to eminence, and are admired. Others, not so generously endowed with those attributes which make great accomplishments possible, are lovable because of their warm sympathies and their kindness of heart. Professor Remington was both admired and loved. And his many, many dear friends are sad at heart, and feel that their personal loss is great. They will not only perpetuate his name, but will cherish in loving remembrance his charming personality.

A. R. L. DOHME.

Pharmacy has suffered great losses during the past year. Many of her greatest lights have gone out. Many a familiar face that was greeted so gladly and cordially by us at our annual meetings will not answer the roll-call this year. The Grim Reaper has cut a wide swath in the field of pharmacy's choicest plants. Prominent and last among those who have passed to the great beyond has been that great disciple of Procter and Parrish upon whom both these founders of American pharmacy concluded to lay their mantle of leaders when they passed away—Joseph Price Remington. They judged wisely when they handed him the torch of American pharmacy and chose him as the leader to keep it lighted and carry it on down the avenue of time along the pages of history. The torch was not very large nor was it burning very brightly when it was transmitted into the hands of Remington in the seventies. He was a born leader however, a born organizer and an indefatigable worker, and on January 1, 1918, when he passed it on after more than forty years of stewardship, it had grown in size and its light was burning more brilliantly than ever before in its life's history. Upon whose shoulders he has put his mantle and into whose hands he has passed the torch is as yet mystery, but will become evident before many years have mapped their course.

Professor Remington's life-work was pharmacy and the Pharmacopoeia, and pharmacy and the Pharmacopoeia owe him a great debt of gratitude for that great work. I will always remember Prof. Remington by what was to my mind his predominating trait—his geniality. No matter what the provocation or occasion, his greeting and his state of mind were always genial to a degree, and in consequence he counted among men a host of friends all of whom will mourn his loss as will pharmacy.

CHARLES H. LAWALL.

When the historian of the future comes to sum up the pharmaceutical progress of the 19th century and the beginning of the 20th, no name will stand out more clearly as an exponent of progress in its broadest sense than that of Joseph Price Remington, who for fifty years has been identified, not only with Philadelphia pharmacy and American pharmacy, but with the pharmacy of the entire civilized world.

He had been honored by foreign associations to a greater degree than any other American pharmacist, yet he never lost his interest in the little every-day problems of his chosen profession.

Proud as he was of his lineage he never obtruded the fact nor gave evidence of the snobbishness often found in the near-great. He was an inspiration and an encouragement to thousands of students who listened with appreciative interest to his lectures. His insight was keen and his judgment phenomenal in matters of great or little moment.

It is too soon to place a correct estimate of value upon his services to his profession, but to those who were close enough to know him well, his true worth will be ever heralded and the purity and sincerity of his life and motives made public.

SOCIETIES AND COLLEGES.

PHARMACY REPRESENTATION IN BUREAU OF CHEMISTRY AND INTERNAL REVENUE DEPARTMENT.

At the last quarterly meeting of the Executive Board of the American Druggists' Fire Insurance Company, Dr. J. H. Beal presented the following timely resolutions, that should receive the endorsement and support of all organizations of the drug trade:

RESOLUTIONS.

WHEREAS, It does not appear that at the present time there are experienced and practically trained representatives of the drug manufacturing and selling industries connected with the U. S. Bureau of Chemistry or with the U. S. Bureau of Internal Revenue, both of which bureaus are charged with the interpretation and administration of laws applying to the manufacturing and selling of drugs and medicinal products; and

WHEREAS, The just and equitable interpretation and application of such laws frequently involves the consideration of technical questions which can be properly answered only by those who have had technical training and practical experience in the manufacturing and selling of drugs and medicinal products; therefore be it

Resolved, That we recommend that the various associations and societies representing the several divisions of the drug trade bring the above statements of fact to the attention of the proper authorities at Washington and urge upon them the appointment in the Bureau of Chemistry and in the Bureau of Internal Revenue of one or more representatives familiar by practical experience with the manufacturing and handling of drugs and medicinal products and of the material used therein.

AMERICAN METRIC ASSOCIATION.

The second meeting of the American Metric Association was held in Pittsburgh in conjunction with the meeting of the American Association for the Advancement of Science on December 28 and 29, 1917.

The sessions on the afternoon of the 28th and the morning of the 29th were held in conjunction with the Section on Social and Economic Science of the A. A. A. S. and at these sittings papers on standardization were read by J. W. McEachren, of the Crane Company, Chicago, and by F. O. Wells, of the Greenfield Tap & Die Co., Greenfield, Mass. In his paper, Mr. Wells pointed out that he employed 1700 hands and that he calculated that he would save $100,000 by the introduction of the metric system. Other papers were read by W. C. Wells, of the Pan-American Union, who discussed measures of volume in metric and other measurements, and by H. T. Wade, who pointed out the importance of the metric system as a means of international standardization.

The session held on the afternoon of the 29th was presided over by Dr. John H. Brashear, of Pittsburgh, and was devoted to reports from President George F. Kunz, Secretary Howard Richards, Jr., and Treasurer A. P. Williams, showing the healthy condition of the association. Fred R. Drake read the report of the executive committee and outlined the activities of the Association in the way of publicity and of coöperation with other national bodies. Dr. H. D. Hubbard, of the Bureau of Standards, gave an interesting address in which he pointed out some of the fallacies of anti-metric arguments.

In the evening was held a metric dinner with a menu based on war-time conditions, the gramme calories of each viand being expressed in units. At the close of the meal impromptu addresses were made, followed by an election of officers, resulting as follows: *President*, G. F. Kunz, of New York; *Vice-Presidents*, William Jay Schieffelin, of New York, E. P. Albrecht, of Philadelphia, and H. V. Arny, of New York; *Secretary*, Howard Richards, Jr., of New York; *Treasurer*, A. P. Williams, of New York.

NATIONAL PHARMACEUTICAL SERVICE ASSOCIATION.

Out of respect to the memory of Prof. Joseph P. Remington, who died January 1st, no meeting of the National Pharmaceutical Service Association was held during January.

Much has been accomplished by the Association for the support of the Edmonds Bill in the past seven months of its existence. Starting with a membership of twenty-seven, the roll of the Association has grown to seven hundred, and a large number of applications are now on hand. Monthly meetings have been held on the second Monday or Tuesday of every month since June 1917, and among the speakers at these meetings were Congress-

man George W. Edmonds, who introduced H. R. 5531 into the House, Dr. H. P. Hynson, of Baltimore, Mr. C. A. Mayo, of New York, Mr. Samuel C. Henry, now of Chicago, and Doctors J. Madison Taylor, F. E. Stewart, and John R. Minehart, of Philadelphia, and Mr. George M. Beringer, of Camden. Some of the papers presented by these speakers have been issued in pamphlet form, and distributed to the members and to the pharmaceutical and medical press.

Shortly before the Edmonds Bill was introduced, a committee of the Association, consisting of Messrs. Geo. M. Beringer, J. W. England, E. G. Eberle, and S. L. Hilton called upon Surgeon-General Gorgas of the United States Army to urge the formation of a Pharmaceutical Corps.

This committee was well received, and four medical officers were detailed by the Surgeon-General to hear their case. At the conclusion of the Conference, the Committee was invited to present to the Surgeon-General a brief summing up the arguments which had been advanced in favor of the creation of a Pharmaceutical Corps in the Army. This was done, and the brief has been published in a number of pharmaceutical journals, thus being given wide publicity.

The only source of income of the Association thus far, with the exception of one or two donations, has been the membership fees, which amount to $1.00 for each member. The money thus collected has been used in carrying on an active propaganda in favor of the Edmonds Bill, and for increasing the membership of the Association. It is felt that the influence of this Association will be directly proportionate to the size of the membership.

It has not been the policy of the National Pharmaceutical Service Association to interfere in any way with the working of any other national, state, or local association. Since its organization, the central theme has been coöperation. It is a very difficult matter to educate and energize the 100,000 or more pharmacists in the United States to the point where they will take it upon themselves to write their Congressmen, urging the passage of the Edmonds Bill, and to enlist the support of laymen, physicians, and other professional men in behalf of recognition for pharmacy in the Army. However, this is the task which the National Pharmaceutical Service Association has imposed upon itself, and with the help of other associations, as well as individuals, the task can be accomplished. Literature has been sent to every member of the American Pharmaceutical Association, to every member of the Pennsylvania and New Jersey State Associations, and, through the good offices of Secretary Edwin L. Newcomb, of the Minnesota State Association, propagandic material and membership application blanks have been sent to the pharmacists of Wisconsin, Minnesota, Iowa, North Dakota, South Dakota and Montana. Letters have also been sent to the secretary of every state pharmaceutical association, informing him of the work being done, and inviting coöperation as well as offering assistance for supporting the Edmonds Bill.

The pharmaceutical journals have given freely of their space to this movement, and through this publicity a great deal in the way of personal activity on the part of individual pharmacists has resulted.

It is planned by the House Committee on Military Affairs to hold a hearing on this bill in the near future at Washington, and as soon as Congressman Edmonds has made the necessary arrangements for a hearing, the various associations will be notified, and it is to be hoped that representatives will be sent to Washington to argue in favor of this measure. The passage of this bill would be the biggest thing that has been accomplished for professional pharmacy in many years, and it is essential that the highest type of representatives of the body pharmaceutic be sent to the meeting. Doubtless a conference of the delegates will be held at Washington before the meeting, and spokesmen will be selected. Everyone, however, can contribute arguments in favor of the bill, and lend encouragement to the speakers, and impress the Committee on Military Affairs by his presence.

The National Pharmaceutical Service Association invites pharmaceutical bodies to coöperate in this movement, and to join as individuals so that the funds may be made available for continuing the needed propaganda. Individual pharmacists can accomplish much by speaking to the newspaper men in their home cities, who will doubtless be glad to give the matter editorial notice. Information for newspapers can be had from the secretary on request. Every pharmacist in the United States has a distinct duty to perform in connection with this work:

1. He should write his U. S. Representatives and Senators, asking for their vote for the bill.

2. He should send a telegram to the Committee on Military Affairs, stating that it is to the best interests of men in the service to have the Edmonds Bill passed.

3. He should acquaint all his friends in civil life with the fact that pharmacy in the Army is not being practiced by pharmacists, and that the safeguards which are thrown around the dispensing and compounding of drugs in their own state are absolutely ignored in the army camp.

It is to be hoped that all of the pharmaceutical interests will combine to send this very necessary measure "over the top." If this is accomplished, there will be enough credit to go around. The thing to do now is to keep everlastingly at it, and achieve success.

The coöperation of *every* pharmacist is necessary.

ROBERT P. FISCHELIS,
Secretary.

OHIO BRANCH NATIONAL PHARMACEUTICAL SERVICE ASSOCIATION.

The National Coöperative Organization to secure the establishment of a Pharmaceutical Corps in the U. S. Army has done effective work, and we are advised that this active body, of which Dr. Frank Cain, of Cincinnati, is secretary, contemplates organizing permanently as the Ohio Branch of the N. P. S. A. This body has sent out much literature and secured recognition from the press. Among the active members are: Dr. John H. Landis, Health Officer of Cincinnati; Dr. E. O. Smith, President Ohio State Medical Association; C. H. Thiesing, President Ohio Pharmaceutical Association; H. J. Dusterberg, President Ohio Valley Druggists' Association; Theodore D. Wetterstroem, Secretary Ohio Pharmaceutical Association; Louis Werner, President Cincinnati Branch A. Ph. A., and numerous others both among pharmacists and physicians; in fact Cincinnati and Ohio generally are deeply interested and intensively active.

This organization shows what can be accomplished, that physicians and surgeons are interested, and coöperative action is possible and helpful. The importance of other states taking similar action is stressed. There must be a central body to prepare literature and direct, so that there may be *concerted* effort. It should be stated that good work is being done in Alabama, California, Texas, Missouri, Illinois, Iowa, Minnesota, New York, New Jersey, Kentucky, Georgia, Maryland, Pennsylvania, Maine, Kansas, etc.; in fact, there seems to be a general awakening of an enthusiasm to stand up for right and justice and to win.

Letters sent to Congressmen should have the personal appeal; a short, personal letter to the point is better than a lengthy document. The brief which is supplied by the National Pharmaceutical Service Association contains the essential points for argument. The assistance of laymen, parents of the soldiers, will be helpful; they expect pharmaceutical service at home, and they will demand it for their sons when our efforts are explained to them. France recognized the value of a pharmaceutical corps, why should not the United States?

THE AMERICAN FAIRCHILD SCHOLARSHIP.

AWARDED TO DANIEL KOLLEN.

The first award of the American Fairchild Scholarship is made to Daniel Kollen of New York City. The American Fairchild scholar is of Russian birth, having been born in the city of Kishinef, State of Bessarabia, Russia, August 27, 1898. The father was a maker of wooden models for shoes; he died when Daniel was about eight years of age. The young man attended a Russian grammar school for about three and a half years and until April 1, 1910, when the family emigrated to the United States, arriving in New York City April 19.

DANIEL KOLLEN

Two weeks after arrival, Kollen entered Manhattan Public School No. 64, where June 29, 1913, the young man received his diploma. The spare hours and vacations were spent in the employ of his uncle at S. H. Ager's Pharmacy, 145 Avenue C, New York City, where he has ever since, up to the present, given his time between studies. September 9, 1913, Daniel entered DeWitt Clinton High School, New York City, from which he gradu-

ated June 30, 1917. His recommendations from the teachers and preceptor are excellent in every way. He matriculated at the Brooklyn College of Pharmacy and is a member of the Junior Class.

NEW YORK DRUG TRADE SECTION OF THE BOARD OF TRADE AND TRANSPORTATION.

The annual meeting of the Drug Trade Section of the New York Board of Trade and Transportation was held on January 8 at the Drug and Chemical Club. The following officers were chosen for the new year: *Chairman*, Howell Foster, of Schieffelin & Co.; *Vice-Chairman*, Turner F. Currens, of the Norwich Pharmacal Co.; *Treasurer*, William A. Hamann, of Roessler & Hasslacher Chemical Co.; *Secretary*, William F. McConnell; *To Represent Drug Trade Section as Director in New York Board of Trade and Transportation*, Burton T. Bush, of Antoine Chiris Co.; *Executive Committee*, Frederick E. Watermeyer, of Fritzsche Bros.; John T. Barry, of D. D. Williamson & Co.; Charles C. Bruen, of Bruen, Ritchey & Co.; Herbert D. Robbins, of McKesson & Robbins, Inc.; Frank C. Starr, of Sharp & Dohme.

Mr. Bush the retiring chairman made a report showing that the Section had patriotically coöperated with President Wilson.

THE PHILADELPHIA DRUG EXCHANGE.

The following officers were elected at the fifty-seventh annual meeting of the Philadelphia Drug Exchange: *President*, Harry B. French, of Smith, Kline & French Co.; *Vice-President*, Harry K. Mulford, of H. K. Mulford Company; *Secretary*, Joseph W. England; *Treasurer*, Anthony M. Hance; *Directors*, Charles E. Hires, of Charles E. Hires Co.; A. Robinson McIlvaine, of McIlvaine Bros.; Dr. Adolph W. Miller, of Aschenbach & Miller; Adam Pfromm, of Adam Pfromm & Co.; Blair Ferguson, of Ferguson Bros.; Clayton F. Shoemaker, of Shoemaker & Busch; Richard M. Shoemaker, of Robt. Shoemaker & Co.; and Walter V. Smith, of Valentine H. Smith & Co. Clayton F. Shoemaker presented the annual report in which he reviewed trade conditions in general and in greater detail those of the drug trade and the problems confronting the interests concerned. Relative to the establishment of a pharmaceutical corps in the U. S. Army he said in part:

"The men at the front are entitled to the very best pharmaceutical service this country can give them and it should be fully as good as that afforded them in civil life. As a matter of public safety no one is permitted to dispense drugs in any State who is not properly and fully qualified and yet in our Army the pharmacist has absolutely no standing as such. A bill to remedy this has been introduced in the Congress by Hon. George W. Edmonds of this city, H. R. 5531. It is a most worthy measure and should be earnestly supported."

The annual dinner was given January 29 at the Bellevue-Stratford. The menu was of the usual excellence and the decorations artistic. President Harry B. French presided as toastmaster and his remarks and introductions of the speakers added zest to the occasion. Chairman Walter V. Smith provided an excellent program and received the congratulations of the guests.

The speakers of the evening were Emil P. Albrecht, President of the Philadelphia Bourse; Daniel Joseph McCarthy, M.D., Professor of Medical Jurisprudence, U. of Pa.; Congressman George W. Edmonds and Captain David Fallon, Oxford and Bucks Light Infantry, Australian and British Forces. The latter gave thrilling experiences of the war and gained the applause of the guests. Dr. McCarthy spoke of conditions in Russia, from where he had recently returned, having been engaged in a special mission. He presented views that enlightened the hearers on the present situation in that country and stressed the importance of the revolution in the future history of the world. Mr. Albrecht spoke of the history of the Bourse and the close and coöperative relation of the Drug Exchange. Congressman Edmonds spoke of the great need for a pharmaceutical corps and enlisted all drug interests to unite in a concerted effort to pass the bill which he had introduced in Congress.

SEVENTH ANNUAL MEETING OF THE AMERICAN DRUG MANUFACTURERS' ASSOCIATION.

The American Drug Manufacturers' Association convened in annual session January 28 at the Waldorf-Astoria, New York City. The first day was devoted to a meeting of several of the Sections, namely, the Committee on Standards and Deterioration, of which Dr. A. R. L. Dohme is chairman, investigating aconite, while Dr. Turner of Eli Lilly & Co. served as chairman of the committee in-

vestigating cannabis indica. The Biological Section also held sessions.

Practically all the national associations concerned with the drug interests were represented and their delegates received and accorded the privileges of the floor. Secretary W. J. Woodruff, in his report, spoke of the effect of the prohibition movement on the drug trade. He stated that bills in the legislatures of various states had placed serious and uncalled-for restrictions on the drug trade and that they were contributing largely to an increased cost of manufacturing.

President C. J. Lynn advocated centralization of supervision over industries and advised that the only policy should be to stand behind the Government in everything. He advocated an interest in the promotion of the sale of Thrift Stamps. He commended the coöperation of the Association with the various departments of the Government and asserted that drugs and medicines were being supplied with more regularity and less interference than other supplies. He praised the organizations of the medical departments of the Army and Navy.

Harry B. Mason read a paper by Frank G. Ryan, chairman of the Committee on Social Insurance, in which attention was called to the present socialistic tendencies. Henry C. Lovis reported on the work of the Committee on Industrial Preparedness, and the following committees also presented their reports: Dr. A. R. L. Dohme, as chairman of the Committee on Standards and Deterioration; Dr. Fred B. Kilmer, as chairman of the Tariff Committee; Charles J. Lynn, as chairman of the Executive Committee; and R. C. Stofer, as chairman of the Committee on Employment Problems.

Several minor changes in the Harrison narcotic law were recommended but it was the general belief of the delegates that the present law had proved a success. Resolutions were adopted by the convention favoring the repeal of the Sherman anti-trust law and pointing out that the Federal Trade Commission now fills the need for which the Sherman law was created, as in that way combinations which may be construed a violation of anti-trust laws could be prevented, whereas the Sherman law is usually not invoked until after such a combination has been formed. It was voted that any attempts of physicians to try to regulate pharmacy laws and of pharmacists to regulate medical laws should be discouraged as harmful and creating discord.

It was recommended that packages of drugs supplied the Government should be specially marked. It was brought out that many orders for drugs and medicines received for the Army and Navy are being held up because there is no standard for the basic drugs of these preparations. The Association will ask for the temporary use of substitutes which have been proved effective until a normal supply of the regular drugs can be obtained. The Association favored the payment of the federal war tax in installments at stated intervals instead of paying the tax in a lump sum.

It was decided to hold the convention next year in March, the exact date to be fixed by the Executive Committee. All the officers of the past year were reëlected, and are as follows: *President*, Charles J. Lynn, of Indianapolis; *Vice-President*, R. C. Stofer, Norwich, N. Y.; *Secretary*, W. J. Woodruff, Detroit; *Treasurer*, Franklin Black, of New York City; *Executive Committee*, Dr. A. R. L. Dohme, of Baltimore, B. L. Murray, of New York, and Charles M. Woodruff, of Detroit.

The members assembled each day at luncheons and the meeting was closed with a banquet, January 30, at which President Charles J. Lynn presided as toastmaster, and speeches were made by Abram Elkus, the United States Ambassador to Turkey, Theodore E. Burton, former United States Senator, and the Rt. Rev. Charles S. Burch, Bishop Suffragan of the Diocese of New York.

IOWA COLLEGE OF PHARMACY.

Iowa College of Pharmacy has quite a list of alumni in the service of their country. Hon. J. M. Lindly is a member of Henry County Council of National Defense; W. R. Jennings and D. T. Stanton and W. A. Dodd are in France. R. G. Odle, R. E. Stewart, R. S. Potter, V. H. Tyler, M. F. Kyhl, C. W. Wilsey, J. P. Sweeney, S. M. Hadnott, and I. W. Fields are located at Camp Dodge, Des Moines. P. J. Hanzlik is with the National Medical Research Council. J. L. Kubicek is in the California Masonic Hospital Corps; W. E Palmer, C. C. Powers, E. J. Meister and Fred Jean are in the Navy. H. W. Preuss, E. D. Brown, J. C. Liek, Charles Carter, R. E. Humphrey, E. L. Bright, I. V. Cozine, B. B. Hunter, P. K. Huston, V. M. Stephenson, W. R. Bryant, T. H. Gillespie, R. E. Barnes, H. J. Tierney, T. H. Beekman and E. T. Bjornstad are doing service or preparing for service in other localities.

COLLEGE OF PHARMACY, UNIVERSITY OF MICHIGAN.

The Detroit Branch of the A. Ph. A. has accepted an invitation to join with the Prescott Club at Ann Arbor for their February meeting.

At the last meeting of the Prescott Club the following papers were much enjoyed:

"Patents," by Miss Irma Neuman.

"Vitamines," by J. A. Wyman.

"The Retail Drug Store," by H. B. McWilliams.

Professor Henry Kraemer attended the annual meetings of the Botanical Society of America at Pittsburgh, Pa., where he delivered a paper, "Some Experiments on the Modification of Color in Plants." Professor Kraemer was also honored by being made subeditor of the Section of Pharmacognosy for the *Botanical Abstracts Journal* which is to be published by that Society.

PHILADELPHIA COLLEGE OF PHARMACY.

One of the stars on the service flag of the P. C. P. will be a gold star in honor of the memory of the late Kenneth Hay, of Dubois, Pennsylvania, a recent student of the Pharmacy course, who gave his life in the fight for freedom "Somewhere in France."

Over a hundred and fifty gift boxes were mailed to the students and recent graduates of the College who are fighting in either branch of service. Many boxes went to France and others to training camps all over the country. They were the gifts of the students attending college, the Faculty of the Institution and prominent alumni.

As the old year silently stole away and the new year was ushered in, there passed from the eyes of men in pharmacy, but not from their memories, the greatest figure in American pharmacy, the revered Dean of the College.

Reminiscent to Dean Remington is the story he often told of Ben. Ben is a colored man with a good heart and respectful manners, and he was much liked by the Dean. Said the Dean to him one day, "Ben, you've heard me lecture for years and you've been around this place long enough to be a druggist. Why don't you hang out your shingle?" After a moment's reflection, Ben answered, "I'll hang the shingle out, Dean, but I'll have to word it 'All prescriptions filled at the owner's risk.' "

Professor Remington's entire scientific library has been bequeathed to Professor Charles H. LaWall and Professor E. Fullerton Cook, to be divided equally between them. For the present the library will be placed in the Pharmacy Department of the College as a reference library for the students in that department and will be catalogued as an adjunct library of the College.

George M. Beringer, Chairman of the Board of Trustees of the College, and Editor of the *American Journal of Pharmacy*, is confined to his home, having suffered a broken ankle, the result of a fall. He is improving as rapidly as can be expected.

MASSACHUSETTS COLLEGE OF PHARMACY.

The walls and roof of the new building are partially completed and the structure now shows the stately and impressive character of its exterior. All glass has been set in the windows, temporary doors are in place and the heating plant is installed and in operation while the interior is being finished. It is slow work to finish such an elaborate building as this at any time, but it is especially slow just now when materials and labor are so scarce and high, so that it will be several months before the interior will be finished and the equipment installed. The work has advanced far enough, however, to begin to show that the interior will in all ways equal the high character of the exterior. Mr. George Robert White, who is presenting the building to us, has kept in close touch with the architects as the work has progressed and the building already shows his unusually fine taste and judgment in architectural matters. Unless prevented by some circumstances not now foreseen, the College expects to occupy the new building before the opening of the next session.

Instructor George L. Burroughs has been granted a leave of absence for the period of the war for service in France with the Red Cross Society. Mr. Burroughs has the title of Inspector, which we understand is equivalent in rank to that of a captain in the army. Vincent J. Fitz-Simon, '17, has been appointed as a substitute for Mr. Burroughs.

CHANGES OF ADDRESS.

All changes of address of members should be sent to the General Secretary promptly.

The Association will not be responsible for non-delivery of the Annual Volume or Year Book, or of the JOURNAL unless notice of the change of address is received before shipment or mailing.

Both the old and the new address should be given thus:

HENRY MILTON,
From 2342 Albion Place, St. Louis, Mo.
To 278 Dartmouth St., Boston, Mass.

Titles or degrees to be used in publications or in the official records should be given, and names should be *plainly* written, or typewritten.

CHANGE OF ADDRESSES SINCE DEC. 18, 1917.

DILL, CHAS. T.,
From 167 W. 143rd St., New York, N. Y.
To 204 W. 141st St., New York, N. Y.

WITTKAMP, C. T.,
From Montgomery & Brewster Ave., Cincinnati, Ohio.
To 25 Erkenbrecher Ave., Cincinnati, Ohio.

HEUSCHLING, ALLEN J.,
From U. S. S. Dixie, cr. Postmaster, New York, N. Y.
To U. S. Embassy, London, Eng., cr. Navy Dept.

ALACÁN, SYLVIA,
From 4528 Chestnut St., Philadelphia, Pa.
To 17 No. 21, Vedado, Cuba.

HIGHT, M. S.,
From 32 Adams Ave., W., Detroit, Mich.
To 1038 8th Ave., Hickory, No. Car.

MCCARTNEY, F. L.,
From 154 W. 18th St., New York, N. Y.
To 203 W. 81st St., New York, N. Y.

BASE, DANIEL,
From 329 N. Schroeder St., Baltimore, Md.
To 3905 Alto Ave., Windsor Hills, Baltimore, Md.

JURADO, BOLIVAR,
From National Institute, Panama City, Rep. of Panama.
To P. O. Box 80, David, Chiriqio, Rep. of Panama.

DUMEZ, A. G.,
From 135 W. Gilman St., Madison, Wis.
To 25 & 3rd St., Hygienic Laboratory, Washington, D. C.

BROWN, ARTHUR F.,
From 219 N. Senate Ave., cr. Swan Myers Co., Indianapolis, Ind.
To 1445 N. 29th St., Philadelphia, Pa.

DEAN, J. A.,
From 1809 Wallace St., Philadelphia, Pa.
To 5420 Baltimore Ave., Philadelphia, Pa.

RITTER, WALTER A.,
From 629 Peosta Ave., Helena, Mont.
To 273 17th St., Milwaukee, Wis.

DECEASED SINCE DEC. 18, 1917.

FISCHNAR, J. F.
Chicago, Ill.

HOLZHAUER, CHARLES,
Newark, N. J.

MCFADDEN, E. A.,
Hackensack, N. J.

REMINGTON, J. P.,
Philadelphia, Pa.

WELDON, GEO.,
Paris, Idaho.

A WORD FROM THE TREASURER.

The A. Ph. A. fiscal year runs even with the calendar year. The annual payment for 1918 was due January 1. The bills were mailed to the members December 17, 1917. It is gratifying to state that at the present writing, January 5, the treasurer has received 725 payments for 1918. A prompt response from the other members will save the association the expense of mailing a second bill.

New Year's greetings to all from

HENRY M. WHELPLEY,
2342 Albion Place, St. Louis, Mo.

BOOK NOTICES AND REVIEWS.

HOW MUCH KNOWLEDGE OF DRUGS AS MEDICINES SHOULD THE PHARMACIST POSSESS TO PRACTICE PHARMACY PROPERLY?

There is considerable difference of opinion in relation to the question, how much knowledge of drugs as medicines the pharmacist should possess to practice pharmacy properly. One side takes the ground that no person is thoroughly competent to practice any medical or surgical art without a medical education, and the other side insists that a specialized training in any one art is all that is necessary to render the practitioner expert.

Those who hold the latter view in regard to pharmacy believe that the interests of the public are best served by pharmacists who know practically nothing about the action of drugs as therapeutic agents, and whose knowledge is limited to the mere fact that certain drugs are cathartics, others diuretics, etc., and who are acquainted with the average doses prescribed for adults and children.

Those who hold to the doctrine that a more general medical education and knowledge concerning the action of drugs on healthy and diseased tissues are necessary to practice pharmacy properly, call attention to the fact that "in the medical schools, over 200 hours are devoted to teaching students knowledge of the medical actions, uses and doses of drugs; and of the symptoms and treatment of poisoning. And, furthermore, the medical student, in order that he may understand these subjects thoroughly, must have pursued studies in anatomy, physiology and pathology for nearly two years; and before being able to apply the knowledge, the student is required to spend another two years or more in the study of disease." This long study, they point out, "is considered by all those capable of judging as absolutely essential to the safety of the public; therefore the pharmacist who, without this knowledge, undertakes to treat the sick by prescribing or recommending medicines over the counter, assumes grave moral responsibilities, and, sooner or later, may have occasion to face serious legal complications."

There are others who hold that pharmacy is a trade or commercial business, and in conducting it the pharmacist and manufacturer should be guided by the same commercial uses pertaining to merchants and manufacturers in other lines. They believe in using advertising to create a demand for medicines and justify themselves in publishing exaggerated claims for therapeutic value by saying, "A certain amount of exaggeration in advertising is considered legitimate in all trades."

Into the midst of this conflict of opinions Dr. Torald Sollmann has injected a treatise on "The Actions of Drugs"[1] consisting of a course of elementary lectures for students of of pharmacy.

Dr. Sollmann is professor of pharmacology and materia medica in the School of Medicine of Western Reserve University, Cleveland, and a member of the Council on Pharmacy and Chemistry of the American Medical Association. The author states in his preface that his course of lectures was planned "with the intention of giving to the young pharmacist a concise survey of the modern conceptions and knowledge of drug action. It was aimed to make this course "sound," but elementary; demanding but little previous knowledge of physiology or anatomy; and not pretending to fit the pharmacist for the treatment of disease. In his introductory chapter he says: "It would be out of the question to give to students of pharmacy a course that would enable them to treat any kind of sickness. Indeed, it would be far better for the public, and even for the pharmacist himself, that the pharmacist should be entirely ignorant of medical actions, than that he should become possessed of the dangerous conceit that he is competent to advise or prescribe any treatment."

It is evident that the prescribing druggist and commercial merchant and manufacturer of medicines will find but little comfort in this statement of the object of Dr. Sollmann's book, though both may find much of interest in its pages; but the professional pharmacist, and the "tradesman" in pharmacy who really strives to give the public a square deal, will find the book of great practical value. The author states this in well-chosen language. He says:

"Nevertheless, to the sensible and tactful pharmacist, some knowledge of these matters is very useful, and indeed necessary. As a

[1] "*The Action of Drugs: A Course of Elementary Lectures for Students of Pharmacy*," By Torald Sollmann, M.D., Professor of Pharmacology and Materia Medica in the School of Medicine of Western Reserve University, Cleveland. Philadelphia and London, W. B. Saunders Company, 1917. 213 pages. Price, $1.50.

tradesman, the public expects the pharmacist to be familiar with the uses to which his wares are commonly put, and with the manner of their use. As a professional man, he can coöperate with the prescribing physician much better, if he has an intelligent understanding of the broad principles which guide treatment, of the objects which are to be accomplished and of the means that are utilized. The pharmacist himself will be protected against many blunders in the exercise of his higher professional function, the compounding of prescriptions. He will be able to protect the public against the errors of others, as well as his own. He may, by the exercise of some tact, put the physician under lasting obligations. In cases of poisoning, he has often the opportunity to institute preliminary treatment which may decide the patient's life."

We predict a large sale for Dr. Sollmann's little treatise. The material is well classified and arranged; the text is written in a style both interesting and concise; the type is large and legible; the reading matter is frequently broken into short paragraphs with suggestive side heads, and the information is useful without burdening the reader with unnecessary data. F. E. STEWART.

Elementary Lessons in Latin.—By Otto A. Wall, M.D., Ph.G., Professor of Materia Medica, Pharmacognosy and Botany in the St. Louis College of Pharmacy, second edition, 148 pages, cloth, $1.50 net. St. Louis, C. V. Mosby Company, 1917.

The object of this book, according to the author, is to "enable the student to read the Latin edition of the German Pharmacopoeia," which he says is "as much Latin as is necessary for the pharmaceutical or medical student." The book is based upon Professor Kuehner's "*Lateinische Vorschule*" and shows throughout the German influence. The continental method of pronunciation is used.

The book is divided into two parts: Part I, consisting of eighty pages, is devoted to grammar, and Part II, containing sixty-eight pages, to vocabulary and reading matter. Grammar, by itself, is dry reading and it would seem that for a beginner it would be preferable to introduce the grammar gradually with the reading matter. The grammar might well be reduced also if the desire is to give only minimum amount of Latin necessary. The main object in using a pharmaceutical Latin text, I take it, is to give the student a technical vocabulary. This part seems comprehensive and very technical, the reading exercises suffer in consequence, necessarily, perhaps, in interest and continuity. For a beginner the book would be easier to use if a complete alphabetical vocabulary had been provided. For a book of its purpose, it might well be shorter and for a book of its length it might better be less technical. The type and paper used are good, the subject matter is easily read, a matter of importance in a text. E. D.

The Practice of Pharmacy.—A Treatise on the Modes of Making and Dispensing Official, Unofficial, and Extemporaneous Preparations, with Descriptions of Medicinal Substances, Their Properties, Uses, and Doses, Intended as a Hand-Book for Pharmacists and Physicians and a Text-Book for Students. By Joseph P. Remington, Ph.M., Phar.D., F. C. S., Chairman of the Committee of Revision of the United States Pharmacopoeial Convention; Dean of the Philadelphia College of Pharmacy, etc., Assisted by E. Fullerton Cook, P.D., Associate Professor of Operative Pharmacy in the Philadelphia College of Pharmacy; Member of the Committee of Revision of the National Formulary. Buckram; 6 by 9 inches; pages 1990; $8.00. Philadelphia: J. B. Lippincott Company, 1917.

Remington's "Practice of Pharmacy" has been the reference and text-book of American pharmacists for more than thirty years and the despair as well as the hope of thousands of students of pharmacy. This, the sixth edition, is a worthy successor of its predecessors and it is safe to say that it will maintain the position that this work has held as the dean of pharmaceutical text-books and one of the most valuable contributions to pharmaceutical literature.

This edition has been enlarged by about four hundred pages making in the single book a volume of over nineteen hundred pages. For convenience the present edition may be secured in two volumes. This review, covering Vol. II, is chiefly one of comparisons, to point out a few of the many excellent features added to and the improvements made in the text of this honored and worthy work. (See also p. 766, August 1917.)

The general plan of the book is the same as in previous editions. Part III treats of the Inorganic Substances; Part IV of Organic Substances, beginning with the Cellulose Group, the Alkaloids, and Products from Animal Substances with a final chapter on

Pharmaceutical Testing; Part V, Magistral Pharmacy; and Part VI a Formulary of Unofficial Preparations and Glossary of Uncommon Names.

The drugs and preparations of the National Formulary IV have been incorporated in the text following the pharmacopoeial preparations of like classification and are discussed in the same manner as the U S. P. subjects. This places at the disposal of the pharmacist the working formulas of both U. S. P. and N. F. in one book and adds greatly to the value of the work.

A review of Volume II shows thorough and careful revision of text as well as the addition of much new material. The introductions to several chapters have been rewritten. In Chapter LI on Sugars and Saccharine Substances a classification of sugars is given, based on that of Tollens. The Alcoholometric Table and Temperature Corrections of the U. S. P. replace Abridged Squibb Table in Chapter LII. Chapter LV on Volatile Oils classifies the volatile oils according to Wallach and their constituents into seven chemical groups. The alkaloids in Chapter LX are classified according to their chemical derivation. Bacterial Vaccines and Bacterins are briefly outlined in Chapter LXI following the article on *Virus Vaccinicum*. This consists of a number of definitions of common terms coming under this heading such as antibodies, opsonins, serobacterins, etc., together with a list of the most important stock vaccines. To Chapter LXIV on Prescriptions has been added the N. A. R. D. Prescription Pricing Schedule. Incompatibilities in Prescriptions, Chapter LXVI, has been improved by the addition of a large list of Incompatibilities of the More Important Newer Remedies. Incompatibilities of aspirin, adrenalin, ichthyol, theobromine, sodio-salicylate, veronal, etc., are explained and will serve as a valuable guide to the dispenser. Chapter LXVII, Solid Extemporaneous Preparations, has been enlarged and new illustrations added. The portion devoted to tablet manufacture has been largely rewritten and the process more fully discussed. Paragraphs describing granulation, diluents, disintegrators, excipients, lubricants and constructing a formula give to the reader a more comprehensive knowledge of this important branch of pharmaceutical manufacturing. A new chapter, LXIX, deals with sterilization and ampuls. The uses of sterilization as applied by pharmacists are enumerated together with brief discussions of common methods whereby sterilization may be accomplished. Ampuls as a means of dispensing sterile solutions and suspensions and methods for filling are described. The student is urged, however, to secure laboratory training in general, bacteriological methods before undertaking work along this line. Part VI, Formulary of Unofficial Preparations, includes a number of new formulas, Paraffin Dressing for Burns, Carrel-Dakin Solution and others.

The charts of U. S. P. and N. F. substances following the various parts have been given the same careful attention in revision as the text. The lists of Unofficial Products that follow the several chapters have had a number of deletions and many additions. Unofficial Products from Coal Tar show addition of such important items as novocaine, novaspirin, salvarsan, etc.

This work offers only such criticisms as are debatable. As a contribution of pharmacy its value has been greatly enhanced by additions and corrections that broaden the scope of the work to such an extent that the intention of the author to make this a comprehensive hand-book as well as a text-book are more fully realized. C. A. DUNCAN.

PUBLICATIONS RECEIVED.

Proceedings of the Pennsylvania Pharmaceutical Association.—At its fortieth annual meeting, with the constitution, by-laws, roll of members, and new State pharmacy and narcotic laws. Also an abstract of the proceedings and roll of members of the Traveling Men's Auxiliary. Held at Hotel Schenley, Pittsburgh, Pa., June 19, 20, 21, 1917.

Proceedings of the New Jersey Pharmaceutical Association.—At its forty-seventh annual meeting. With constitution and by-laws, roll of members, the pharmacy act of New Jersey; list of registered pharmacists, the Traveling Men's Auxiliary and the Women's Auxiliary. Held at Lake Hopatcong, New Jersey, June 12, 13, 14 and 15, 1917.

Proceedings of the California Pharmaceutical Association.—At its eleventh annual meeting. Held at Hotel Oakland, Oakland, Cal., May 23, 24 and 25, 1917.